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Preliminary Assessments and Site Inspections Report Upper Columbia River Mines and Mills Stevens County, Washington TDD: 01-02-0028

Contract: 68-S0-01-01 October 2002

Region 10

START-2

Superfund Technical Assessment and Response Team

Submitted To: Monica Tonel, Task Monitor United States Environmental Protection Agency 1200 Sixth Avenue Seattle, Washington 98101

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LIST O F AC RO NYMS

Acronym	Definition
AST	aboveground storage tank
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act

CES	Cascade Earth Sciences
CLP	Contract Laboratory Program
cfs	cubic feet per second
COCs	contaminants of concern
CRM	Casting Residue Mound
CRDL	Contract Required Detection Limit
CRQL	Contract Required Quantitation Limit
DNR	Washington State Department of Natural Resources
DQOs	data quality objectives
E & E	Ecology and Environment, Inc.
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
ESAT	Environmental Services Assistance Team
ESP	electrostatic precipitate
gpm	gallons per minute
GPS	global positioning system
HDPE	high-density polyethylene
HRS	Hazard Ranking System
IDW	investigation-derived waste
	Lake RooseveltFranklin D. Roosevelt Lake
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
msl	mean sea level
MS/MSD	matrix spike/matrix spike duplicate
NW	Northwest
PAs	preliminary assessments

LIST O F AC RO NYMS (C O NTINUED)

Acronym Definition PPE probable point of entry QA/QC quality assurance/quality control %R percent recovery RCRA Resource Conservation and Recovery Act RI remedial investigation RPD relative percent difference SIs sit e invest igations SOW statement of work SQAP sampling and quality assurance plan SQL sample quantitation

limit SVOCs semivolatile organic compounds ST ART Superfund T echnical Assessment and Response T eam T AL T arget Analyte List T DD T echnical Direction Document T DL target distance limit TM Task Monitor T OC total organic carbon WEST ON Roy F. Weston, Inc. XRF X-ray fluorescence

PRELIMINARY ASSESSMENTS AND SITE INSPEC TIO NS REPO RT UPPER C O LUMBIA RIVER MINES AND MILLS S TEVENS C O UNTY, W AS HINGTO N

1. INTRO DUC TIO N

T he United States Environmental Protection Agency (EPA) has tasked Ecology and Environment, Inc. (E & E) to provide technical support in investigating potential sources of contamination to the upper Columbia River project area. T he upper Columbia River project area is defined for this investigation as the portion of the Columbia River beginning at approximately river mile (RM) 675 near Inchelium, Washington, extending upstream to the U.S.-Canada border at approximately RM 745 (Figure 1-1). T he Columbia River is the principal inflow to Lake Roosevelt and contributes about 90 percent of the flow from a large drainage area in Canada and the United States(Figure 1-2).

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) activities conducted for this project included preliminary assessments (PAs) and site investigations (SIs) for 39 mine and mill sites in Stevens County, Washington (Figures 1-3 and 1-4). T he PAs and SIs were conducted under the authority of CERCLA of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986. A list of the 39 mine and mill sites visited in Stevens Count y are presented in T able 1-1. T able 1-1 identifies mine and mill sites which the Confederated T ribes of the Colville Reservation petitioned the EPA for assessment under CERCLA (Cawston 1999; Passmore 2000). T he remaining mine and mill sites listed in T able 1-1 were identified by the EPA based on the location of the mine and/or mill relat ive t o tributaries t hat empty into t he upper Columbia River (project area) and available information regarding volume of ore produced.

A detailed discussion of related field activit ies conducted at 21 mine and mill sites visited in Pend Oreille Count y can be found in t he *Lower Pend Oreille River Mines and Mills Prelim inary Assessm ents and Site Investigations Report*

prepared by E & E for EPA, dated April 2002.

T he P As and SIs are phases in t he sit e assessment process for det ermining whet her a sit e has released, is releasing, or has the potential to release, hazardous substances, pollutants, or contaminants into the environment and whether it requires further detailed investigation and/or response action that is authorized by CERCLA. T he assessment process does not include extensive or complete site characterization, contaminant fate determination, or quantitative risk assessment.

T he objectives of the PAs and SIs are to:

+ Identify potential sources of contamination to the upper Columbia River project area;
+ Det ermine whet her the mines or mills are releasing, or have t he pot ent ial t o release hazardous constituents into the environment;
+ Document the threat or potential threat to public health or the environment posed by the mines or mills;
+ Assess the need for additional detailed investigation and/or response action at the mines or mills; and
+ Determine the potential for placement of each mine or mill on t he National Priorities List.

Field activities were conducted through a combined effort involving Superfund T echnical Assessment and Response T eam (ST ART)-2 contractor firms, E & E and Roy F. Weston, Inc. (WEST ON). Sampling activities were conduct ed at 18 of t he 39 mine and mill sites visit ed in Stevens County. E & E conducted sampling at mines and mills where potential sources of contamination were identified and possible impacts to receptors via the surface water migration pathway were observed. In addition, the soil exposure pathway was evaluated for the Deep Creek Mine and the LeRoi/Northport Smelter. E & E activities were conducted under ST ART-2 Contract No. 68-S0-01-01 and T echnical Direction Document (T DD) No. 01-02-0028. WEST ON collected sediment samples in tributaries to the upper Columbia River and mine and mill-specific background samples as determined necessary by the EPA. WEST ON activities were conducted under ST ART-2 Contract No. 68-S0-01-02 and T DD No. 01-02-001-A.

Activities conducted as part of this investigation include reviewing existing mine and mill-specific information, regional charact eristics, collect ing receptor information within the mine or mill's range of influence, conduct ing visits t o the mine and mill sites, executing t he sampling plan, and producing this report.

In accordance with the sampling and quality assurance plan (SQAP), attempts were made to conduct in-situ field screening of metals concentrations at potential contaminant sources using X-ray fluorescence (XRF) equipment. Due to field conditions, the instruments exceeded operating temperatures on several occasions. It was determined that the equipment was not able to function properly in a high temperature environment and its use was discontinued. A memo presenting the results of the limited XRF screening conducted is included in Appendix D.

Section 2 of this document includes a discussion of the regional operations and waste characteristics. Section 3 provides a description of the field activities conducted by E & E and WEST ON. Quality assurance/quality control (QA/QC) criteria are included in Section 4. Reporting criteria, reporting methods, and background sample analytical results are discussed in Section 5. Mine and mill locations, descriptions, and ST ART-2 site visits are discussed in Section 6. Section 7 provides a discussion of contaminant sources, potential targets/receptors and sampling results associated with each mine and mill site sampled. Mine/mill-specific findings and recommendations are summarized in Section 8. References are provided in Section 9. Photographic documentation is provided in Appendix

A. Copies of ST ART-2 and EPA logbooks are provided in Appendix B. Global positioning system (GPS) coordinates are provided in Appendix C. Data quality assurance review memorandums and analytical data forms are provided in Appendix D. The data for the samples collected in the Kettle River are provided in Appendix E. Historical site maps of LeRoi/Northport Smelter are provided in Appendix F. The Northport city wells analytical data are provided in Appendix G. The trip report prepared by WEST ON is provided in Appendix H. The analytical results of routine monitoring at the City of Addy municipal water supply wells is provided in Appendix I.

PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS Table 1-1 MINES AND MILLS VISITED UPPER COLUMBIA RIVER MINES AND MILLS STEVENS COUNTY, WASHINGTON

Mine/Mill Name	Latitude			Longitude			S	T	R
Daisy Mine	48	22	45.80	118	4	42.60	7	33N	38E
L-Bar/Northwest Magnesite*	48	15	21.94	117	43	6.25	23	32N	40E
Northwest Alloys*	48	2	26.00	117	50	54.00	14	33N	39E

		1							
Napoleon Mine/Mill*	48	44	12.10	118	06	4.32	3	37N	37E
First Thought Mine*	48	53	2.04	118	09	32	18	39N	37E
Lottie Mine	48	51	53.28	118	01	15.24	19	39N	38E
Homestake No. 1 Mine	48	52	06.96	118	01	18.84	19	39N	38E
Antelope Mine	48	52	04.80	118	01	05.88	19-20	39N	38E
Hubbard Mine	48	55	15.96	117	52	03.72	32	40N	39E
New Leadville Mine	48	44	08.52	117	52	33.60	3	37N	39E
R.J. Mine	48	43	54.84	117	52	31.80	3	37N	39E
Van Stone Mine/Mill*	48	45	38.16	117	45	23.76	33	38N	40E
Hope and Twin Cabins Mine	48	53	09.96	118	01	37.92	7 and 18	39N	38E
St. Crispin Mine*	48	56	30.99	117	47	7.47	25	40 N	39E
Northport Mill*	48	56	31.08	117	45	15.66	29	40 N	40E
LeRoi/Northport Smelter*	48	55	23.16	117	46	02.28	33	40N	40E
Black Rock Mine/Mill	48	52	13.45	117	42	22.12	24	39N	40E
Great Western Mine	48	52	06.24	117	41	48.48	24	39N	40E
Last Chance Mine/Mill*	48	51	59.40	117	41	56.40	24	39N	40E
Deep Creek Mine*	48	51	48.96	117	42	54.36	26	39N	40E
Copper King Mine	48	46	51.60	117	39	12.24	20	38N	41E
Sierra Zinc Mine/Mill*	48	46	28.20	117	40	06.24	20	38N	41E
Magma Mine.	48	46	00.48	117	38	25.08	28	38N	41E
Farmer Mine	48	50	59.28	117	37	17.40	34	39N	41E
Maki Mine	48	50	45.60	117	36	00.00	35	39N	41E
Electric Point Mine/Mill*	48	52	56.28	117	32	29.04	17-18	39N	42E
Gladstone Mine/Mill*	48	53	12.48	117	32	35.16	18	39N	42E
Lucky Four Mine	48	52	51.60	117	32	33.00	18	39N	42E
Red Top Mine	48	56	35.88	117	33	52.20	25	40N	41E
Anderson Calhoun Mine/Mill*	48	55	09.84	117	35	28.68	2	39N	41E
Lucile Mine	48	57	01.08	117	33	12.24	30	40N	42E
Iroquois Mine	48	5	06.12	117	32	22.92	30	40N	42E

		7							
Silver Queen Mine	48	32	56.90	118	06	57.60	11	35N	37E
Melrose Mine	48	56	44.52	117	38	45.96	28	40N	41E
Lakeview Mine	48	57	51.84	117	32	57.12	19	40N	42E
Jackson Mine	48	57	35.64	117	34	08.04	24	40N	41E
Frisco-Standard Mine	48	59	34.80	117	26	39.48	12	40N	42E
Mycerah Mine	48	59	26.16	117	27	14.76	11	40N	42E
United Treasure Mine	48	59	21.48	117	27	51.12	11	40N	42E

Source: Maptech. 2001, Andover, Massachusetts.
* Mine/mill sites petitioned by The Colville Confederated Tribes to the EPA for assessment under CERCLA.

Key: CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980. EPA = United States Environmental Protection Agency. S = Section. T = Township. R = Range. E = East. N = North. RM = River mile TDL = Target Distance Limit.

2. BACKGRO UND

2.1 MINE/MILL O WNERSHIP

Property owners and/or representatives for the mines/mills visited are identified in Section 6. Consent for access to each mine and mill sites visited was obtained prior to conducting the visits.

2.2 REGIO NAL O PERATIO NS AND WASTE C HARACTERISTICS

2.2.1 Historic Mining

T he mining district surrounding the towns of Colville, Chewelah, Addy, and Northport in Stevens County, Washington dates back to the 1880s (Battien 1998). Stevens County's Embry Camp is the oldest mining district in the state. T he Chewelah mining district was one of the

earliest to be discovered and put into production. Stevens County produced the most gold in the state of Washington from 1905 to 1908 and again in 1922. The county led the state in the number of producing mines in 1928. By 1962, a geological survey stated that Stevens County produced half of the minerals of the state of Washington. (Battien 1998)

3. FIELD AC TIVITIES AND ANALYTIC AL PRO TO C O L

A SQAP for the upper Columbia River PAs and SIs was developed by the ST ART-2 prior to performing the field sampling (E & E 2001). T he SQAP describes the sampling strategy, sampling methodology, and analytical program used to identify potential hazardous substance source areas and impacts to potential targets. With few exceptions, field activities were conducted in accordance with the approved SQAP. Deviations from the SQAP are described when applicable. Field activities were conducted in coordination with United States Department of the Interior Bureau of Land Management, United States Department of Agriculture Forest Service, and Washington State Department of Ecology (Ecology) staff.

T he field event was conducted from June 17 to 30 and September 9 to 15, 2001. Sampling was conducted at 18 of the 39 mines and mills visited. Sampling was conducted at t hose mines and mills where potential sources of contamination were identified and where possible impacts to receptors via the surface water migration pathway were observed. In addition, the soil exposure pathway was evaluated for the Deep Creek Mine and the LeRoi/Northport Smelter. Possible receptors of contamination that were identified were also sampled.

As described in the SQAP, potential contaminant sources may include t ailings piles/ponds, waste rock piles, adits, and stained soil areas surrounding improperly stored or disposed drums and containers. Potential receptors/targets may include wetland areas, fisheries, surface water intakes, sensitive environments, etc. as defined in the EPA Hazard Ranking System (HRS); Final Rule. T he contaminants of concern (COCs) include T arget Analyte List (T AL) metals, chlorinated pesticide/polychlorinated biphenyls (pesticide/PCBs), and semivolatile organic compounds (SVOCs). T otal organic carbon (T OC) dat a was also collect ed for sediment samples.

A total of 203 soil/sediment samples and 13 surface water samples were collected by E & E and analyzed under the EPA Cont ract Laboratory Program (CLP) for T AL met als. Sixt y-eight soil/sediment and two surface water samples were also analyzed under the EPA CLP for pesticide/PCBs. T hirtyfour soil/sediment and two surface water samples, were analyzed for SVOCs. A total of 20 sediment samples were submitted to a commercial laboratory for T OC analysis. WEST ON collected a total of 120 sediment samples and 5 surface water samples. T able 3-1 provides a summary of sample collection information.

Sample types and the methods of collection are described below. A discussion of sample results is contained in Sections 6 and 7. Photographic documentation of the PAs and SIs field activities are contained in Appendix A.

Information pertinent to WEST ON's related sampling activities involving the collection of mine and mill-specific background samples is included in Appendix H.

3.1 SAMPLING METHODOLOGY

Sampling for surface soil, surface water, and sediment followed the standard operating procedures contained in Appendix A of the SQAP (E & E 2001). Grass, leaves and other vegetative material, rocks and other debris unsuitable for analysis were removed from soil samples before being placed into the sampling containers. Surface soil and sediment samples

were homogenized in dedicated plastic bowls (except for pesticide/PCBs analysis) prior to placement in sample jars. Dedicated plastic spoons and scoops were used to extract, homogenize, and place sample material into sample containers (except for pesticide/PCBs analysis). Dedicated steel bowls and steel spoons were used for the collection and homogenization of pesticide/PCBs samples.

Water samples were collected by hand dipping a 1-liter polyethylene bottle sample container into the water at well-mixed locations within the stream, or by using an unused sample container as a scoop to obtain water samples in areas of low flow. An aliquot of each sample was tested in the field for temperature and pH. After preservation, pH was checked again to ensure that the appropriate pH level had been achieved.

All samples were st ored on ice in coolers continuously maintained under chain-of-cust ody. Vehicles were locked if the sampling team had to walk out of visual range. Sample coolers from all teams were moved into a single occupied location (motel room) each evening to ensure custody control and to re-ice as needed.

3.1.1 EPA CLP Surface Soil Samples

A total of 159 surface soil samples, including 9 background samples, were collected. Soil samples were discrete grab samples collected from potential source and background areas. Surface soil samples were collected from 0 to 6 inches below ground surface (bgs). Samples were analyzed for T AL metals. A portion of samples also were analyzed for pesticide/PCBs (42 samples) and SVOCs (12 samples).

3.1.2 EPA CLP Sediment Samples

A total of 44 sediment samples, including 9 background samples, were collected as outlined in the text of the SQAP (E & E 2001). Sediment samples were collected from below the apparent water line from 0 to 8 inches below the sediment surface in order from most downstream locations to most upstream locations. Samples were analyzed for T AL metals. T wenty-six samples also were analyzed for pest icide/P CBs, SVOCs (22 samples), and T OC (20 samples).

3.1.3 EPA CLP Surface Water Samples

A total of 13 surface water samples were collected prior to collecting co-located

sediment samples and from the most downstream locations to the most upstream locations. Water samples were analyzed for T AL metals. A portion of samples also were analyzed for pesticide/PCBs (two samples) and SVOCs (t wo samples).

3.2 ANALYTICAL PRO TO CO LS

All samples collected were shipped off-site for chemical analysis, with the exception of field measurement for pH. Analytical methods applied to E & E samples consisted of: EPA CLP T AL metals, EPA CLP pesticide/PCBs, EPA CLP SVOCs, and EPA SW-846 T OC. T hese analyses were applied to samples collected from suspected sources or targets in varying combinations based on the SQAP. Laboratories performing the analyses are noted in Section 4. Analysis applied to mine and mill-specific background samples collected by WEST ON were based on the approved SQAP; *Upper Columbia River/Lake Roosevelt Expanded Site Inspection Sampling and Quality Assurance Plan*, T DD No. 01-02-0001-A, EPA Contract: 68-S0-01-02, prepared for the EPA Region 10 by WEST ON, May 2001.

3.3 GLO BAL PO SITIO NING SYSTEM

T rimble™ P at hfinder P rofessional XL GPS survey unit s and dat a loggers were used by t he ST ART-2 to approximate the horizontal location coordinates of sample points. Except as noted for specific sample locations, the units provided three-dimensional differentially-corrected sample coordinates with ± 1 meter accuracy. Due to the combination of the mountainous terrain and limited

satellite coverage over this area, the GPS units were often operating in no more than two-dimensional mode.

Sample coordinates were plotted onto a digitized map and then incorporated into geographic information system databases to develop a station/sample location map. T he ST ART-2 was not able to obtain accurate GPS coordinates at some locations due to mountainous terrain. T hese station locations were estimated on the sample location map based on field observations. GPS coordinates by sample point are provided in Appendix C. WEST ON GPS coordinates are found in Appendix H.

3.4 INVESTIGATIO N-DERIVED W ASTE

Investigation-derived waste (IDW) generated during the sampling effort consisted of used personal protective clothing and disposable sampling equipment. IDW was disposed of as non-hazardous solid waste at a municipal landfill. No IDW generated by the ST ART-2 remains in the project area.

Table 3-1 SAMPLE COLLECTION AND ANALYTICAL SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PI AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	E & E Sample ID	Station Location ID	CLP Organic No.	CLP Inorganic No.	Matrix	Depth	Sampler	Date	Time	TAL Metals	Pesticide/ PCBs	TOC	VOCs	SVOCs	
Daisy Mine															
01374161	010904 26	DTPP01SD	J0KH0	MJ0KH0	SD	0-6	HZ	09/10/0 1	15: 55	X	X	X			Sand 50%, silt 3 gray to brown, tr
01374162	NU	DTAD01S W	NU	MJ0KH1	SW	-	HZ	09/10/0 1	16: 30	X					-
01374164	NU	DTTP01SS	NU	MJ0KH3	SS	0-6	HZ	09/10/0 1	17: 10	X					Silty soil, 5 inch
01374165	NU	DTTP02SS	NU	MJ0KH4	SS	0-6	HZ	09/10/0 1	17: 25	X					Silt 60%, Sand 1 gravel, 25% subr
01374166	NU	DTTP03SS	NU	MJ0KH5	SS	0-6	HZ	09/10/0 1	18: 25	X				X	70% sand, very f gravel, angular t organics.
L-Bar/Northwest Magnesite															
01374101	010904 01	LBDT01SD	J0KC1	MJ0KC1	SD	0-8	RL	09/10/0 1	14: 30	X	X	X		X	Dark brown to b clay, roots, pla
01374102	010904 02	LBDT02SD	J0KC2	MJ0KC2	SD	0-8	RL	09/10/0 1	15: 00	X	X	X		X	Organic rich, we brown/black.
01374103	010904 03	LBDT03SD	J0KC3	MJ0KC3	SD	0-8	RL	09/10/0 1	15 30	X	X	X		X	Dark brown to o
01374110	010904 10	LBPP01SD	J0KD1	MJ0KD1	SD	0-8	RL	09/11/0 1	9:1 0	X	X	X		X	Silty sand, brow
Northwest Alloys															
01374105	010904 05	NAPP01SD	J0KC5	MJ0KC5	SD	0-8	RL	09/10/0 1	17: 15	X	X	X		X	Fine sand with fi
01374106	010904 06	NACK01S D	J0KC6	MJ0KC6	SD	0-8	RL	09/10/0 1	17: 45	X	X	X		X	Gravelly sand an
01374107	010904 07	NADT01S D	J0KC7	MJ0KC7	SD	0-8	RL	09/10/0 1	18: 15	X	X	X		X	Silt, very fine sar
Napoleon Mine/Mill															
01374112	NU	NPAD01S W	NU	MJ0KD3	SW	-	JS	09/12/0 1	9.4 5	X					Clear, no odor.
01374113	010904 12	NPPP01SD	J0KD3	MJ0KD4	SD	0-8	JS	09/11/0 1	10: 05	X	X	X		X	Silty loam, light organics.

STEVENS COUNTY, WASHINGTON

EPA Sample ID	E & E Sample ID	Station Location ID	CLP Organic No.	CLP Inorganic No.	Matrix	Depth	Sampler	Date	Time	TAL Metals	Pesticide/ PCBs	TOC	VOCs	SVOCs	
Van Stone Mine/Mill															
01254312	NU	VSTP21SS	NU	MJ0EW6	TL	0-6	AJ	06/22/01	12:20	X					Gray, fine and sa
01254313	NU	VSPP01SD	NU	MJ0EW7	SD	6-8	AJ	06/22/01	12:50	X					Dark gray, fine, n
01254314	NU	VSPP02SD	NU	MJ0EW8	SD	6-8	AJ	06/22/01	13:25	X					Dark gray, fine, n
01254315	NU	VSTP01SS	NU	MJ0EW9	SS	0-6	AJ	06/22/01	14:40	X					Gray sand and soi
01254316	NU	VSTP02SS	NU	MJ0EX0	SS	0-6	AJ	06/22/01	15:15	X					Dark gray/brown,
01254317	NU	VSTP03SS	NU	MJ0EX1	SS	0-6	AJ	06/22/01	15:30	X					Dark gray, dry, fi
01254318	NU	VSTP04SS	NU	MJ0EX8	SS	0-6	AJ	06/22/01	15:45	X					Fine, dry, gray, sa
01254319	NU	VSTP05SS	NU	MJ0EX3	SS	0-4	AJ	06/22/01	15:50	X					Brown, fine, dry s
01254320	NU	VSTP06SS	NU	MJ0EX4	SS	0-6	AJ	06/22/01	16:00	X					Brown, fine, dry s
01254321	NU	VSTP07SS	NU	MJ0EX5	SS	0-6	AJ	06/22/01	16:10	X					Brown, fine, dry s
01254322	NU	VSTP08SS	NU	MJ0EX6	SS	0-6	AJ	06/22/01	16:15	X					Very fine, brown,
01254323	NU	VSTP09SS	NU	MJ0EX7	SS	0-6	AJ	06/22/01	16:20	X					Dark brown, fine,
01254324	NU	VSSS01SS	NU	MJ0F12	SS	0-6	AJ	06/23/01	9:15	X	X			X	Moist, brown, fin
01254325	NU	VSSS02SS	NU	MJ0EX9	SS	0-6	AJ	06/23/01	9:40	X	X			X	Moist, brown, fin
01254326	NU	VSSS03SS	NU	MJ0EY0	SS	0-6	AJ	06/23/01	10:10	X	X			X	Dark brown, mois
01254327	NU	VSSS04SS	NU	MJ0EY1	SS	0-6	AJ	06/23/01	10:45	X	X				Dark green, very
01254328	NU	VSSS05SS	NU	MJ0EY2	SS	0-6	MW	06/23/01	10:47	X	X				Brown, dry, fine t
01254329	NU	VSSS06SS	NU	MJ0EY3	SS	0-6	AJ	06/23/01	11:30	X	X			X	Brown, dry, fine t
01254330	NU	VSSS07SS	NU	MJ0EY4	SS	0-6	AJ	06/23/01	11:35	X	X			X	Moist brown with
01254331	NU	VSTP10SS	NU	MJ0EY5	SS	0-6	AJ	06/23/01	13:35	X					Moist brown soil
01254332	NU	VSTP11SS	NU	MJ0EY6	SS	0-6	AJ	06/23/01	13:45	X					Fine, brown, dry,
01254333	NU	VSTP12SS	NU	MJ0EY7	SS	0-6	AJ	06/23/01	13:50	X					Fine, brown, dry,
01254334	NU	VSTP13SS	NU	MJ0EY8	SS	0-6	AJ	06/23/01	14:20	X					Fine gray/brown,
01254335	NU	VSTP14SS	NU	MJ0EY9	SS	0-6	AJ	06/23/01	14:25	X					Fine gray/brown,
01254336	NU	VSTP15SS	NU	MJ0EZ0	SS	0-6	AJ	06/23/01	14:00	X					Fine, slightly moi
01254337	NU	VSTP16SS	NU	MJ0EZ1	SS	0-6	AJ	06/23/01	14:40	X					Fine, gray, dry so

01254338	NU	VSTP17SS	NU	MJ0EZ2	SS	0-6	AJ	06/23/01	14:45	X					Fine, brown, dry
01254339	NU	VSTP18SS	NU	MJ0EZ3	SS	0-6	AJ	06/23/01	14:05	X					Fine, brown, dry
01254340	NU	VSTP19SS	J0EZ4	NU	SS	0-6	AJ	06/23/01	15:45		X				Dark gray, fine
01254341	NU	VSTP20SS	J0EZ5	NU	SS	0-6	MW	06/23/01	15:45		X				Dark gray, fine
01254196	NU	VSWP01SS	NU	MJ0GJ5	SS	0-6	NA	06/23/01	10:40	X					Coarse sand w
01254197	NU	VSWP02SS	NU	MJ0GJ6	SS	0-6	NA	06/23/01	11:05	X					Tan/gray fine sa
01254198	NU	VSWP03SS	NU	MJ0GJ7	SS	0-6	NA	06/23/01	11:50	X					Tan/gray sandy
01254199	NU	VSWP04SS	NU	MJ0GJ8	SS	0-6	NA	06/23/01	12:15	X					Tan sandy gra

Table 3-1 SAMPLE COLLECTION AND ANALYTICAL SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PI AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	E & E Sample ID	Station Location ID	CLP Organic No.	CLP Inorganic No.	Matrix	Depth	Sampler	Date	Time	TAL Metals	Pesticide/ PCBs	TOC	VOCs	SVOCs	
Van Stone Mine/Mill (continued)															
01254200	NU	VSWP05SS	NU	MJ0GJ9	SS	0-6	NA	06/23/01	12:40	X					Gray fine sand w
01254201	NU	VSWP06SS	NU	MJ0GK0	SS	0-6	NA	06/23/01	13:35	X					Gray fine sandy
01254202	NU	VSWP07SS	NU	MJ0GK1	SS	0-6	NA	06/23/01	13:55	X					Gray fine sand w
01254203	NU	VSWP08SS	NU	MJ0GK2	SS	0-6	NA	06/23/01	14:15	X					Light tan fine sa
01254204	NU	VSWP09SS	NU	MJ0GK3	SS	0-6	NA	06/23/01	14:40	X					Light tan fine
01254205	NU	VSWP10SS	NU	MJ0GK4	SS	0-6	NA	06/23/01	15:15	X					Tan fine sand wi
01254206	NU	VSWP11SS	NU	MJ0GK5	SS	0-6	NA	06/23/01	15:35	X					Tan/gray very fi
01254207	NU	VSWP12SS	NU	MJ0GK6	SS	0-6	NA	06/23/01	15:55	X					Coarse gray sand
01254360	NU	VSSP01SW	NU	MJ0FJ9	SW	-	RN	06/23/01	10:50	X					No odor, moss pr
01254361	NU	VSPP03SD	J0FK0	MJ0FK0	SD	6-8	RN	06/23/01	11:20	X	X				Gray sand/grav el
01254362	NU	VSMW01SW	NU	MJ0FK1	SW	-	RN	06/23/01	11:40	X					Clear.
01254363	NU	VSMW01SD	J0FJ1	MJ0FK2	SD	6-8	RN	06/23/01	11:45	X	X				Silty sand to fine odor.
01254364	NU	VSPP04SD	J0FJ2	MJ0FK3	SD	6-8	RN	06/23/01	13:50	X	X				Dark brown, med
LeRoi/Northport Smelter															
01264431	NU	NSSL01SD	NU	MJ0GP0	SD	0-6	CG	06/28/01	13:15	X					Dark brown to bl
01264432	NU	NSSL02SD	NU	MJ0GP1	SD	0-6	CG	06/28/01	13:50	X					Dark brown to bl
01264433	NU	NSSL03SD	NU	MJ0GP2	SD	0-6	CG	06/28/01	14:10	X					Mixed brown and

01264434	NU	NSSL04SD	NU	MJ0GP3	SD	0-6	CG	06/28/01	14:20	X					Mixed brown and
01264435	NU	NSSL05SD	NU	MJ0GP4	SD	0-6	CG	06/28/01	14:30	X					Black medium to
01264436	NU	NSSL06SD	NU	MJ0GP5	SD	0-6	CG	06/28/01	15:15	X					Brown fine sand
01264437	NU	NSSL07SD	NU	MJ0GP6	SD	0-6	CG	06/28/01	15:30	X					Brown fine to ver
01264438	NU	NSSL08SD	NU	MJ0GP7	SD	0-6	CG	06/28/01	15:45	X					Brown fine to ver
01264439	NU	NSSL09SD	NU	MJ0GP8	SD	0-6	CG	06/28/01	16:25	X					Brown fine to ver
01374182	NU	NSSL01SS	NU	MJ0KK0	SS	0-6	HZ	09/13/01	9:25	X					No odor, silty loa
01374183	NU	NSSL02SS	NU	MJ0KK1	SS	0-6	HZ	09/13/01	10:45	X					85% sand, very fi medium brown su and yellowish sta
01374184	NU	NSSL03SS	NU	MJ0KK2	SS	0-6	HZ	09/13/01	11:00	X					85% sand, very fi medium brown su yellowish stain.
01374185	01090430	NSDT01SD	J0KJ1	MJ0KK3	SD	0-8	JS	09/13/01	12:05	X	X	X		X	Light brown, subi very coarse grain
01374186	01090431	NSPP01SD	J0KJ2	MJ0KK4	SD	0-8	JS	09/13/01	12:30	X	X	X		X	Silty, saturated, li

Table 3-1

SAMPLE COLLECTION AND ANALYTICAL SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECT
STEVENS COUNTY, WASHINGTON

EPA Sample ID	E & E Sample ID	Station Location ID	CLP Organic No.	CLP Inorganic No.	Matrix	Depth	Sampler	Date	Time	TAL Metals	Pesticide/ PCBs	TOC	VOCs	SVOCs	
Black Rock Mine/Mill															
01254160	NU	BRWP01SS	NU	MJ0GE9	SS	0-6	NA	06/19/01	17:25	X					Light brown med
01254161	NU	BRWP02SS	NU	MJ0GF0	SS	0-6	NA	06/19/01	17:30	X					Light brown/gray
01254162	NU	BRWP03SS	NU	MJ0GF1	SS	0-6	NA	06/19/01	17:40	X					Light brown sand.
01254163	NU	BRMS01SS	NU	MJ0GF2	SS	0-6	NA	06/19/01	18:00	X					Light brown loam
01254164	NU	BRMS02SS	NU	MJ0GF3	SS	0-6	NA	06/19/01	18:05	X					Light brown loam
Great Western Mine															
01254177	NU	GWWP01SS	NU	MJ0GG6	SS	0-6	NA	06/21/01	11:20	X					Brown course sar
01254178	NU	GWWP02SS	NU	MJ0GG7	SS	0-6	NA	06/21/01	11:30	X					Brown/orange co
Last Chance Mine/Mill															
01254165	NU	LCMS01SS	NU	MJ0GF4	SS	0-6	NA	06/20/01	10:10	X					Medium brown fi
01254166	NU	LCMS02SS	NU	MJ0GF5	SS	0-6	NA	06/20/01	10:25	X					Medium brown fi

01254167	NU	LCMS03SS	NU	MJ0GF6	SS	0-6	NA	06/20/01	10:35	X					Medium brown/o
01254168	NU	LCPP01SD	NU	MJ0GF7	SD	0-8	NA	06/20/01	10:45	X					Gray/brown/blac organic odor.
01254169	NU	LCTP01SS	NU	MJ0GF8	SS	0-6	NA	06/20/01	11:30	X					Fine sand/silt mi
01254170	NU	LCTP02SS	NU	MJ0GF9	SS	0-6	NA	06/20/01	11:40	X					Fine sand/silt mi
01254171	NU	LCTP03SS	NU	MJ0GG0	SS	0-6	NA	06/20/01	11:45	X					Loose sand w/ro
01254172	NU	LCAD01SW	NU	MJ0GG1	SW	-	DW	06/20/01	13:15	X					Clear water no o
01254173	NU	LCPP02SD	NU	MJ0GG2	SD	0-8	DW	06/20/01	13:25	X					Brown black
01254174	NU	LCWP01SS	NU	MJ0GG3	SS	0-6	NA	06/20/01	13:55	X					Brown fine sand
01254175	NU	LCWP02SS	NU	MJ0GG4	SS	0-6	NA	06/20/01	14:10	X					Brown fine sand
01254176	NU	LCWP03SS	NU	MJ0GG5	SS	0-6	NA	06/20/01	14:20	X					Brown fine sand
Deep Creek Mine															
01254251	NU	DCWP01SS	NU	MJ0EN5	SS	0-6	CG	06/20/01	10:00	X					White, quartz lik
01254252	NU	DCWP02SS	J0EN6	MJ0EN6	SS	0-6	CG	06/20/01	10:14	X	X				White quartz like
01254253	NU	DCWPO3SS	J0EN7	MJ0EN7	SS	0-6	CG	06/20/01	10:20	X	X				White quartz like
01254254	NU	DCWP04SS	J0EN8	MJ0EN8	SS	0-6	CG	06/20/01	10:28	X	X				White quartz like
01254255	NU	DCTP01SS	J0EN9	MJ0EN9	SS	0-6	CG	06/20/01	10:38	X	X				Fine, light brown
01254256	NU	DCTP02SS	J0EP0	MJ0EP0	SS	0-6	CG	06/20/01	10:44	X	X				Fine, light brown
01254257	NU	DCTP03SS	J0EP1	MJ0EP1	SS	0-6	CG	06/20/01	10:50	X	X				Fine, light brown
01254258	NU	DCTP04SS	J0EP2	MJ0EP2	SS	0-6	CG	06/20/01	14:13	X	X				Fine, light brown
01254259	NU	DCTP05SS	J0EP3	MJ0EP3	SS	0-6	CG	06/20/01	14:15	X	X				Fine, light brown
01254260	NU	DCTP06SS	J0EP4	MJ0EP4	SS	0-6	CG	06/20/01	14:18	X	X				Fine, light brown
01254261	NU	DCTP07SS	J0EP5	MJ0EP5	SS	0-6	CG	06/20/01	11:25	X	X				Fine, light brown rocks.
01254262	NU	DCTP08SS	J0EP6	MJ0EP6	SS	0-6	CG	06/20/01	11:35	X	X				Fine, light brown rocks.
01254263	NU	DCTP09SS	J0EP7	MJ0EP7	SS	0-6	CG	06/20/01	11:45	X	X				Fine, light brown rocks.

Table 3-1 SAMPLE COLLECTION AND ANALYTICAL SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PI AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	E & E Sample ID	Station Location ID	CLP Organic No.	CLP Inorganic No.	Matrix	Depth	Sampler	Date	Time	TAL Metals	Pesticide/ PCBs	TOC	VOCs	SVOCs	
Deep Creek Mine (continued)															

01254264	NU	DCTP10SS	J0EP8	MJ0EP8	SS	0-6	CG	06/20/01	12:03	X	X				Fine, dry.
01254265	NU	DCTP11SS	J0EP9	MJ0EP9	SS	0-6	CG	06/20/01	12:07	X	X				Fine, dry.
01254266	NU	DCTP12SS	J0EQ0	MJ0EQ0	SS	0-6	CG	06/20/01	12:07	X	X				Fine, dry.
01254267	NU	DCWP05SS	NU	MJ0EQ1	SS	0-6	CG	06/20/01	12:43	X					White, quartz like
01254268	NU	DCTP13SS	J0EQ2	MJ0EQ2	SS	0-6	CG	06/20/01	13:26	X	X				Light brown, fine rocks.
01254269	NU	DCTP14SS	J0EQ3	MJ0EQ3	SS	0-6	CG	06/20/01	13:39	X	X				Light brown, fine rocks.
01254270	NU	DCTP15SS	J0EQ4	MJ0EQ4	SS	0-6	CG	06/20/01	13:31	X	X				Light brown, fine rocks.
01254271	NU	DCAD01SW	NU	MJ0EQ5	SW	-	MW	06/20/01	13:45	X					No odor, clear.
01254272	NU	DCTP16SS	J0EQ6	MJ0EQ6	SS	0-6	CG	06/20/01	13:49	X	X				Fine slightly moi
01254273	NU	DCTP17SS	J0EQ7	MJ0EQ7	SS	0-6	CG	06/20/01	13:50	X	X				Fine, slightly moi
01254274	NU	DCTP18SS	J0EQ8	MJ0EQ8	SS	0-6	CG	06/20/01	13:53	X	X				Fine, slightly moi
01254275	NU	DCSD01SD	NU	MJ0EQ9	SD	0-6	CG	06/20/01	15:15	X					Moist fine brown
01254276	NU	DCSW01SW	NU	MJ0ER0	SW	-	CG	06/20/01	15:15	X					Clear water no od
Copper King Mine															
01254156	NU	CKWP01SS	NU	MJ0GE5	SS	0-6	NA	06/19/01	14:15	X					Fine orange/brow
01254157	NU	CKWP02SS	NU	MJ0GE6	SS	0-6	NA	06/19/01	14:25	X					0-3 inches fine or
01254158	NU	CKAD01SW	NU	MJ0GE7	SW	-	NA	06/19/01	15:00	X					Clear water no od
01254159	NU	CKPP01SD	NU	MJ0GE8	SD	0-8	NA	06/19/01	15:15	X					Light brown med
Sierra Zinc Mine/Mill															
01254277	NU	SZTP01SS	NU	MJ0ER1	TL	0-6	GG	06/21/01	10:30	X					Black/gray silt.
01254278	NU	SZTP02SS	NU	MJ0ER2	TL	0-6	GG	06/21/01	10:35	X					White/medium sa
01254279	NU	SZTP03SS	NU	MJ0ER3	TL	0-6	GG	06/21/01	10:40	X					Beige fine sand/c
01254280	NU	SZTP04SS	NU	MJ0ER4	SS	0-6	GG	06/21/01	10:52	X					Dark gray, fine, d
01254281	NU	SZTP05SS	NU	MJ0ER5	SS	0-6	GG	06/21/01	10:54	X					Dark gray, fine, n
01254282	NU	SZTP06SS	NU	MJ0ER6	SS	0-6	GG	06/21/01	10:56	X					Black, fine, moist
01254283	NU	SZTP07SS	NU	MJ0ER7	SS	0-6	GG	06/21/01	10:58	X					Gray, lumpy, clay
01254284	NU	SZTP08SS	NU	MJ0ER8	SS	0-6	GG	06/21/01	11:00	X					Muddy, gray, fine
01254285	NU	SZTP09SS	NU	MJ0ER9	SS	0-6	GG	06/21/01	11:04	X					Coarse, gray, slig
01254286	NU	SZTP10SS	NU	MJ0ES0	SS	0-6	GG	06/21/01	11:11	X					Brown, fine, dry s
01254287	NU	SZTP11SS	NU	MJ0ES1	SS	0-6	GG	06/21/01	11:13	X					Brown, fine, dry s
01254288	NU	SZTP12SS	NU	MJ0ES2	SS	0-6	GG	06/21/01	11:16	X					Moist, brown, cla
01254289	NU	SZTP13SS	NU	MJ0ES3	SS	0-6	GG	06/21/01	12:24	X					Gray, moist clay.
01254290	NU	SZTP14SS	NU	MJ0ES4	SS	0-6	GG	06/21/01	12:27	X					Gray, moist claye
01254291	NU	SZTP15SS	NU	MJ0ES5	SS	0-6	GG	06/21/01	12:29	X					Gray, moist claye

Table 3-1 SAMPLE COLLECTION AND ANALYTICAL SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PE AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	E & E Sample ID	Station Location ID	CLP Organic No.	CLP Inorganic No.	Matrix	Depth	Sampler	Date	Time	TAL Metals	Pesticide/ PCBs	TOC	VOCs	SVOCs	
Sierra Zinc Mine/Mill (continued)															
01254292	NU	SZTP16SS	NU	MJ0ES6	SS	0-6	GG	06/21/01	12:33	X					Light gray, sligh
01254293	NU	SZTP17SS	NU	MJ0ES7	SS	0-6	GG	06/21/01	12:35	X					Gray and black,
01254294	NU	SZTP18SS	NU	MJ0ES8	SS	0-6	GG	06/21/01	12:37	X					Gray, dry clayey
01254295	NU	SZTP19SS	NU	MJ0ES9	SS	0-6	GG	06/21/01	12:41	X					Gray, dry clayey
01254296	NU	SZTP20SS	NU	MJ0ET0	SS	0-6	GG	06/21/01	12:43	X					Gray, dry clayey
01254297	NU	SZTP21SS	NU	MJ0ET1	SS	0-6	GG	06/21/01	12:45	X					Gray/brown, dry
01254298	NU	SZAD01SW	NU	MJ0ET2	SW	-	GG	06/21/01	13:39	X					Clear, no odor
01254299	NU	SZWP01SS	J0ET3	MJ0ET3	SS	0-6	GG	06/21/01	14:00	X	X				Brown, dry fines
01254300	NU	SZWP02SS	J0ET4	MJ0ET4	SS	0-6	GG	06/21/01	14:05	X	X				Brown, dry fines
01254301	NU	SZWP03SS	J0ET5	MJ0ET5	SS	0-6	GG	06/21/01	14:10	X	X				Gray, fine, dry s
01254302	NU	SZWP04SS	NU	MJ0ET6	SS	0-6	GG	06/21/01	14:22	X					Gray, fine, dry s
01254303	NU	SZWP05SS	NU	MJ0ET7	SS	0-6	GG	06/21/01	14:25	X					Gray, fine, dry s
01254304	NU	SZWP06SS	NU	MJ0ET8	SS	0-6	GG	06/21/01	14:28	X					Gray, fine, dry s
01254305	NU	SZWP07SS	NU	MJ0ET9	SS	0-6	GG	06/21/01	14:33	X					Light brown fine
01254306	NU	SZWP08SS	NU	MJ0EW0	SS	0-6	GG	06/21/01	14:36	X					Light brown, fine
01254307	NU	SZWP09SS	NU	MJ0EW1	SS	0-6	GG	06/21/01	14:39	X					Gray, sandy, fine
01254308	NU	SZWP10SS	NU	MJ0EW2	SS	0-6	GG	06/21/01	14:44	X					Gray and black, s
01254309	NU	SZWP11SS	NU	MJ0EW3	SS	0-6	GG	06/21/01	14:47	X					Gray and black, s
01254310	NU	SZWP12SS	NU	MJ0EW4	SS	0-6	GG	06/21/01	14:50	X					Brown fine, dry s
01254311	NU	SZMS01SS	J0EW5	MJ0EW5	SS	0-6	GG	06/21/01	14:55	X	X				Black, fine, sligh
Electric Point Mine/Mill															
01254185	NU	EPWP01SS	NU	MJ0GH4	SS	0-6	NA	06/22/01	12:45	X					Fine/medium tan
01254186	NU	EPWP02SS	NU	MJ0GH5	SS	0-6	NA	06/22/01	12:50	X					Fine/medium tan
01254187	NU	EPWP03SS	NU	MJ0GH6	SS	0-6	NA	06/22/01	12:58	X					Fine/medium tan
01254188	NU	EPMS01SS	NU	MJ0GH7	SS	0-6	NA	06/22/01	13:10	X					Fine medium bro

01254189	NU	EPMS02SS	NU	MJ0GH8	SS	0-6	NA	06/22/01	13:15	X					Fine medium bro
01254190	NU	EPMS03SS	NU	MJ0GH9	SS	0-6	NA	06/22/01	13:25	X					Fine medium bro
01254191	NU	EPWP04SS	NU	MJ0GJ0	SS	0-6	NA	06/22/01	14:15	X					Fine medium bro
01254192	NU	EPWP05SS	NU	MJ0GJ1	SS	0-6	NA	06/22/01	14:25	X					Light brown/tan s
01254193	NU	EPTP01SS	NU	MJ0GJ2	SS	0-6	NA	06/22/01	14:35	X					Fine medium high
01254194	NU	EPTP02SS	NU	MJ0GJ3	SS	0-6	NA	06/22/01	14:40	X					Brown/orange fin
01254195	NU	EPTP03SS	NU	MJ0GJ4	SS	0-6	NA	06/22/01	14:45	X					Brown/tan fine sa

Table 3-1 SAMPLE COLLECTION AND ANALYTICAL SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PF AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	E & E Sample ID	Station Location ID	CLP Organic No.	CLP Inorganic No.	Matrix	Depth	Sampler	Date	Time	TAL Metals	Pesticide/ PCBs	TOC	VOCs	SVOCs	
Gladstone Mine/Mill															
01254179	NU	GLTP01SS	NU	MJ0GG8	SS	0-6	DW	06/21/01	16:10	X					Fine brown/orang
01254180	NU	GLTP02SS	NU	MJ0GG9	SS	0-6	NA	06/21/01	16:22	X					Fine brown/orang
01254181	NU	GLTP03SS	NU	MJ0GH0	SS	0-6	NA	06/21/01	16:30	X					Fine brown silty s
01254182	NU	GLMS01SS	NU	MJ0GH1	SS	0-6	NA	06/21/01	16:35	X					Fine/medium red/
01254183	NU	GLMS02SS	NU	MJ0GH2	SS	0-6	NA	06/21/01	16:45	X					Medium brown s
01254184	NU	GLMS03SS	NU	MJ0GH3	SS	0-6	NA	06/21/01	16:55	X					Brown/orange fin
Red Top Mine															
01254153	NU	RDWP01SS	NU	MJ0GE2	SS	0-6	NA	06/18/01	15:50	X	X				Light brown fine
01254154	NU	RDWP02SS	NU	MJ0GE3	SS	0-6	NA	06/18/01	16:00	X	X				Light brown fine
01254155	NU	RDWP03SS	NU	MJ0GE4	SS	0-6	NA	06/18/01	16:10	X	X			X	Medium brown fi
Anderson Calhoun Mine/Mill															
01374167	NU	ANAD01SW	NU	MJ0KH6	SW		HZ	09/11/01	15:25	X					20 sec to fill 1 L l
01374168	NU	ANSS01SS	J0KH1	MJ0KH7	SS	0-6	HZ	09/12/01	9:30	X	X			X	Stained soil black palette. 50% grav sand, very fine to
01374169	NU	ANSS02SS	J0KH2	MJ0KH8	SS	0-6	HZ	09/12/01	9:40	X	X			X	Stained soil black very coarse grave to gray.
01374170	NU	ANTP01SS	NU	MJ0KH9	SS	0-6	HZ	09/12/01	10:45	X					100% silt, gray.
01374171	NU	ANTP02SS	NU	MJ0KJ0	SS	0-6	HZ	09/12/01	11:00	X					100% silt, gray.
01374172	NU	ANTP03SS	NU	MJ0KJ1	SS	0-6	HZ	09/12/01	11:05	X					100% silt, light g

01374173	NU	ANTP04SD	NU	MJ0KJ2	SD	0-6	HZ	09/12/01	11:10	X					100% silt, dark br
01374174	NU	ANTP05SD	NU	MJ0KJ3	SD	0-6	HZ	09/12/01	11:20	X					100% silt, dark br
01374175	NU	ANTP06SD	NU	MJ0KJ4	SD	0-6	HZ	09/12/01	11:45	X					100% silt, dark br
01374177	01090428	ANCK01SD	J0KH4	MJ0KJ6	SD	0-8	HZ	09/12/01	14:00	X	X	X		X	100% silt, light b
01374178	01090429	ANPP01SD	J0KH5	MJ0KJ7	SD	0-6	HZ	09/12/01	15:10	X	X	X		X	95% silt 5% san black, dark color
01374179	NU	ANSS03SS	J0KH6	MJ0KJ8	SS	0-6	HZ	09/12/01	13:15	X	X			X	Sand 50%, ver Silt 20%, light angular to subr
01374180	NU	ANSS04SS	J0KH7	MJ0KJ9	SS	0-6	HZ	09/12/01	13:25	X	X			X	Sand 55%, ver gravel to cobbles with trace orga

Table 3-1

SAMPLE COLLECTION AND ANALYTICAL SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECT
STEVENS COUNTY, WASHINGTON

EPA Sample ID	E & E Sample ID	Station Location ID	CLP Organic No.	CLP Inorganic No.	Matrix	Depth	Sampler	Date	Time	TAL Metals	Pesticide/ PCBs	TOC	VOCs	SVOCs	
Iroquois Mine															
01254356	NU	IRAD01SW	NU	MJ0FJ5	SW	-	RN	06/22/01	13:50	X	X			X	Clear, no odor, n
01254357	NU	IRAD02SW	NU	MJ0FJ6	SW	-	RN	06/22/01	14:25	X					Clear, no odor
01254358	NU	IRWP01SS	NU	MJ0FJ7	SS	0-6	RN	06/22/01	14:40	X					Gray sandy Silt
01254359	NU	IRWP02SS	NU	MJ0FJ8	SS	0-6	RN	06/22/01	14:55	X					Dark gray, sandy
Melrose Mine															
01254151	NU	MLPP01SD	NU	MJ0GE0	SD	0-8	NA	06/18/01	12:10	X	X			X	Brown sand w/ fi
01254152	NU	MLAD01SW	NU	MJ0GE1	SW	-	NA	06/18/01	12:20	X	X			X	No odor to the w
Background															
01264251	NU	BK01SS	J0EZ6	MJ0EZ6	SS	0-6	MW	06/24/01	8:00	X	X				Brown, dry, fine
01264275	NU	BK04SS	NU	MJ0F21	SS	0-6	MW	06/28/01	10:10	X					Black, fine, silty
01264276	NU	BK05SS	NU	MJ0F22	SS	0-6	MW	06/28/01	11:30	X					Brown, dry, fine
01264279	NU	BK06SS	NU	MJ0F25	SS	0-6	MW	06/28/01	13:45	X					Brown, dry, fine
01264280	NU	BK07SS	NU	MJ0F26	SS	0-6	MW	06/28/01	15:05	X					Brown, dry, fine
01264281	NU	BK08SS	NU	MJ0F27	SS	0-6	MW	06/28/01	15:45	X					Brown, dry, fine
01374181	01090427	ANBK01SD	J0KH3	MJ0KJ5	SD	0-6	HZ	09/12/01	15:45	X	X	X		X	98% sand, very f Trace

															2%gravel, brown
01374189	NU	ANBK02SS	NU	MJ0KK7	SS	0-6	HZ	09/13/01	14:35	X					Brown color, orga
01374163	NU	DTBK01SS	NU	MJ0KH2	SS	0-6	HZ	09/10/01	16:55	X					Sandy soil, trace
01374104	010904 04	LBBK01SD	J0KC4	MJ0KC4	SD	0-8	RL	09/10/01	16:15	X	X	X		X	Dry, hard mud wi organic content, s
01374111	010904 11	LBBK02SD	J0KD2	MJ0KD2	SD	0-8	RL	09/11/01	10:00	X	X	X		X	Brown, fine to co
01374108	010904 08	NABK01SD	J0KC8	MJ0KC8	SD	0-8	RL	09/10/01	18:30	X	X	X		X	Gravelly sand.
01374109	010904 09	NABK02SD	J0KC9	MJ0KC9	SD	0-8	RL	09/11/01	8:05	X	X	X		X	Blue-green, silty
01374187	010904 32	NSBK01SD	J0KJ3	MJ0KK5	SD	0-8	JS	09/13/01	13:00	X	X	X		X	20% gravel off w 20% silt, 60% sand - v
01374188	NU	NSBK02SS	NU	MJ0KK6	SS	0-6	JS	09/13/01	13:15	X				X	Silty loam light b
01374114	010904 13	NPBK01SD	J0KD4	MJ0KD5	SD	0-8	JS	09/12/01	10:45	X	X	X		X	Light brown, 20% 20% gravel. 60% silty
01374223	NU	KRBK01SD	J0KK9	MJ0KK9	SD	0-8	MT	09/12/01		X	X			X	Sandy silt, dark b
01374224	NU	KRBK02SD	J0KL0	MJ0KL0	SD	0-8	MT	09/12/01		X	X			X	Brown sand.

Table 3-1

SAMPLE COLLECTION AND ANALYTICAL SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECT
STEVENS COUNTY, WASHINGTON

EPA Sample ID	E & E Sample ID	Station Location ID	CLP Organic No.	CLP Inorganic No.	Matrix	Depth	Sampler	Date	Time	TAL Metals	Pesticide/ PCBs	TOC	VOCs	SVOCs	
WESTON Samples															
01224158	NU	RS001	JX556	MJ0981	RS		SMF	05/31/01	0830	X	X				
01224159	NU	RS002	JX557	MJ0982	RS		SMF	05/31/01	0900	X	X				
01234135	NU	RS003	JX792	MJ0BJ3	RS		SMF	06/08/01	0800	X	X				
01264071	NU	RS004	JX830	MJ0BQ4	RS		KB	06/27/01	0700	X	X				
01204013	NU	RW001	JX428	MJ08Y5	RS		SMF	05/15/01	1120	X	X		X	X	Clear, colorless, r
01204108	NU	TB001	JX547	NU	TB		SMF	05/14/01	1145				X		
01204109	NU	TB002	JX549	NU	TB		SMF	05/14/01	1000				X		
01234079	NU	TS001	NU	MJ0BJ7	SD	0-2	SMF	06/05/01	1000	X					0% gravel, ~5% s medium

															brown. Rootlets c
01234080	NU	TS002	NU	MJ0BJ5	SD	0-0.5	SMF	06/05/01	1045	X					0% gravel, <1% brown. dry. Organics (ro sample.
01234053	NU	TS003	NU	MJ09E4	SD	0-3	KB	06/03/01	1500	X					0% gravel, 30% f odor or slag, n
01234081	NU	TS004	JX570	MJ0BJ6	SD	0-2	SMF	06/05/01	1145	X	X	X			0% gravel, 30% Saturated, mediu black underneath fragments, insect "sewage" smell
01234052	NU	TS005	JX559	MJ09E6	SD	0-2	KB	06/03/01	1315	X	X	X			0% gravel, 90 clay. Grayish b debris.
01234082	NU	TS006	NU	MJ0BJ7	SD	0-2	SMF	06/05/01	1245	X					0% gravel, 60 medium grayish (rootlets and w
01234054	NU	TS007	JX558	MJ09E5	SD	0-4	KB	06/04/01	1430	X	X	X			5% gravel, 75% brown, no odor o
01234083	NU	TS008	NU	MJ0BJ8	SD	0-1	SMF	06/05/01	1400	X					0% gravel, 15% medium grayish rootlets, twigs, an up ~10% of samp
01234055	NU	TS009	NU	MJ09E8	SD	0-3	KB	06/04/01	1645	X					0% gravel, 100% odor or slag, oc
01234058	NU	TS010	NU	MJ09E7	SD	0-3	KB	06/04/01	1550	X					20% fine gravel, clay. Brown, no debris.
01234084	NU	TS011	NU	MJ0BJ9	SD	0-2	SMF	06/05/01	1445	X					0% gravel, 10% Dry. grayish brown (fragments) make slag.
01234051	NU	TS012	NU	MJ09F0	SD	0-3	KB	06/03/01	1045	X					0% gravel, 40% no odor, no slag

Table 3-1 SAMPLE COLLECTION AND ANALYTICAL SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PI AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	E & E Sample ID	Station Location ID	CLP Organic No.	CLP Inorganic No.	Matrix	Depth	Sampler	Date	Time	TAL Metals	Pesticide/ PCBs	TOC	VOCs	SVOCs	
WESTON Samples (continued)															
01234056	NU	TS013	NU	MJ09E9	SD	0-4	KB	06/04/01	1245	X					0% gravel, 75% grayish brown, n no other debris
01234057	NU	TS014	NU	MJ09F1	SD	0-3	KB	06/04/01	1400	X					0% gravel, 90% light brown, no debris.

01234050	NU	TS015	NU	MJ09F2	SD	0-2	KB	06/03/01	0935	X					0% gravel, 60% s no odor, no slag.
01234096	NU	TS016	NU	MJ0BK8	SD	0-1	SMF	06/05/01	1545	X					0% gravel, 50% v <1% clay. Dry, m including rootlets
01234097	NU	TS017	NU	MJ0BK9	SD	0-1	SMF	06/05/01	1630	X					0% gravel, 20% v light grayish brov and woody fragm
01234098	NU	TS018	NU	MJ0BL0	SD	0-1	SMF	06/06/01	0945	X					0% gravel, 10% v Dry, medium gray including twig fra
01234085	NU	TS019	NU	MJ09F3	SD	0-2	SMF	06/06/01	1030	X					20% gravel (gran sand, 15% silt, 0% to dark grayish br (rootlets and woo
01234059	NU	TS020	NU	MJ09F4	SD	0-2.5	SMF	06/03/01	1030	X					0% gravel, 10% s Dark gray, moist,
01234060	NU	TS021	NU	MJ09F5	SD	0-1.5	SMF	06/03/01	1100	X					0% gravel, 20% f clay. Dry, light br odor, no slag.
01234099	NU	TS022	JX571	MJ0BL1	SD	0-2	SMF	06/06/01	1100	X	X	X			0% gravel, 60% v 10% clay. Saturat Some rootlets. No
01234100	NU	TS023	NU	MJ0BL2	SD	0-1.5	SMF	06/06/01	1245	X					0% gravel, 10% f clay. Saturated. M organics including No odor, no slag.
01234101	NU	TS024	NU	MJ0BL3	SD	0-3	SMF	06/06/01	1300	X					<1% gravel (gran <5% clay. Dry, li including rootlets of sample. No od

Table 3-1 SAMPLE COLLECTION AND ANALYTICAL SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PR AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	E & E Sample ID	Station Location ID	CLP Organic No.	CLP Inorganic No.	Matrix	Depth	Sampler	Date	Time	TAL Metals	Pesticide/ PCBs	TOC	VOCs	SVOCs	
WESTON Samples (continued)															
01234102	NU	TS025	NU	MJ0BL4	SD	0-5	SMF	06/06/01	1330	X					0% gravel, 65% f Dry, light grayish bark, rootlets, and 40% or more of th
01234061	NU	TS026	NU	MJ09F6	SD	0-2	SMF	06/03/01	1300	X					10% fine gravel, clay, dark brown, particles. No slag
01234064	NU	TS027	NU	MJ09F7	SD	0-2	KB	06/04/01	1200	X					0% gravel, 35% f brown, no odor or debris.

01234086	NU	TS028	NU	NJ09F8	SD	0-2	SMF	06/06/01	1415	X					0% gravel, 60% s medium brown N fragments). No s
01234062	NU	TS029	NU	MJ09F9	SD	0-1	SMF	06/03/01	1345	X					40% flat, angular sand, 30% silt, 3 some organics, n
01234087	NU	TS030	NU	MJ09G0	SD	0-1.5	SMF	06/06/01	1515	X					0% gravel, 65% clay. Dry to mois material makes u debris, woody m
01234103	NU	TS031	JX572	MJ0BL5	SD	0-8	SMF	06/06/01	1600	X	X	X			0% gravel 100% clay Highly or debris, like peat dark gravish
01234112	NU	TS032	NU	MJ0BM4	SD	0-2	KB	06/07/02	0915	X					5% fine gravel 0% clay Dark w woody debris
01234063	NU	TS033	NU	MJ09G1	SD	0-2	SMF	06/03/01	1450	X					0% gravel, 10% Very dark gravis Strong S odor s organics, appar
01234113	NU	TS034	NU	MJ0BM5	SD	0-3	KB	06/07/01	1000	X					0% gravel, 100% brown, no odor o
01234128	NU	TS035	NU	MJ0BK8	SD	0-4	SMF	06/09/01	1500	X					<1% gravel (gra <5% clay Moist, of plant detritus
01234129	NU	TS036	JX793	MJ0BK9	SD	0-6	SMF	06/09/01	1530	X	X	X			<1% angular gra (including clods) "Soil" odor, no s of sample.
01234067	NU	TS037	NU	MJ09G2	SD	0-4	KB	06/04/01	0930	X					0% gravel, 100% brown. No odor Page 11 of 18

Table 3-1 SAMPLE COLLECTION AND ANALYTICAL SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PF AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	E & E Sample ID	Station Location ID	CLP Organic No.	CLP Inorganic No.	Matrix	Depth	Sampler	Date	Time	TAL Metals	Pesticide/ PCBs	TOC	VOCs	SVOCs	
WESTON Samples (continued)															
01234068	NU	TS038	JX560	MJ09G3	SD	0-3	KB	06/04/01	1030	X	X	X			10% gravel, 70% no odor or slag s
01234114	NU	TS039	NU	MJ0BM6	SD	0-2	KB	06/07/01	1030	X					5% fine gravel clay Light brown other debris.
01234071	NU	TS040	NU	MJ09G6	SD	0-3	KB	06/06/01	1200	X					0% gravel, 100% brown, no odor o
01234115	NU	TS041	NU	MJ0BM7	SD	0-2	KB	06/07/01	1130	X					0% gravel, 60% Brown, no odor o
01234116	NU	TS042	NU	MJ0BM8	SD	0-1	KB	06/07/01	1300	X					0% gravel, 50% brown, no odor o

01234072	NU	TS043	NU	MJ09G7	SD	0-4	SMF	06/04/01	1015	X					0% gravel, 70% s medium brown, d medium Organic fragments and roo
01234106	NU	TS044	JX573	MJ0BL8	SD	0-4	KB	06/06/01	1500	X	X	X			0% gravel, 90% f brown, no odor or debris.
01234075	NU	TS045	JX564	MJ09H0	SD	0-7	SMF	06/04/01	1830	X	X	X			1% gravel (granul sand, 90% silt, 5% no odor, abundan
01234076	NU	TS046	JX565	MJ0BJ1	SD	0-1.5	SMF	06/04/01	1745	X	X	X			<1% gravel, 40% medium grayish b organic matter in organics, and woo
01234077	NU	TS047	JX566	MJ0BJ2	SD	0-2	SMF	06/04/01	1715	X	X	X			~ 1% gravel, 15% 44% clay. Strong gray. Organic ma
01234073	NU	TS048	JX562	MJ09G8	SD	0-2	SMF	06/04/01	1105	X	X	X			20% gravel (gran coarse); trace silt, saturated. No obv
01234117	NU	TS049	NU	MJ0BM9	SD	0-2	KB	06/07/01	1645	X					0% gravel, 100% Brown, no odor o debris.
01234136	NU	TS050	NU	MJ0BJ4	SD	0-3	SMF	06/09/01	1730	X					<1% gravel, 70% silt, 10% clay. W
01234118	NU	TS051	NU	MJ0BN0	SD	0-3	KB	06/07/01	1600	X					0% gravel, 70% n clay. Dark brown. roots/pine needle

Table 3-1 SAMPLE COLLECTION AND ANALYTICAL SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PR AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	E & E Sample ID	Station Location ID	CLP Organic No.	CLP Inorganic No.	Matrix	Depth	Sampler	Date	Time	TAL Metals	Pesticide/ PCBs	TOC	VOCs	SVOCs	
WESTON Samples (continued)															
01234104	NU	TS052	NU	MJ0BK6	SD	0-4	KB	06/07/01	1500	X					0% gravel, 100% Brown, no odor o debris. Bottom in 70% sand, 30% si
01234119	NU	TS053	NU	MJ0BN1	SD	0-2	KB	06/07/01	1430	X					0% gravel, 85% n clay, brown, no o debris.
01234120	NU	TS054	NU	MJ0BN2	SD	0-2	KB	06/07/01	1400	X					0% gravel, 100% Light brown, no c debris.
01234078	NU	TS055	NU	MJ0BJ3	SD	0-1	SMF	06/04/01	1300	X					0% gravel, 90% s ~5% clay. Mediu odor. Some fine b slag. Black organ
01234107	NU	TS056	JX574	MJ0BL9	SD	0-1.5	KB	06/06/01	1645	X	X	X			0% gravel, 80% f brown, no odor or debris.

01234108	NU	TS057	JX791	MJ0BM0	SD	0-3	KB	06/06/01	1600	X	X	X			0% gravel, 80% c Grayish brown r debris.
01234109	NU	TS058	NU	MJ0BM1	SD	0-4	KB	06/06/01	1400	X					0% gravel, 100% clay. Grayish bro woody twigs, no
01234121	NU	TS059	NU	MJ0BJ1	SD	0-5	SMF	06/09/01	1645	X					10% gravel, 70% clay. Moist, dark slag, some shell n
01234065	NU	TS060	NU	MJ09F8	SD	0-1	KB	06/06/01	0900	X					15% fine gravel 0% clay, brown needles, no other
01234110	NU	TS061	NU	MJ0BM2	SD	0-3	KB	06/06/01	1245	X					5% fine gravel clay. Dark brown twig material
01234111	NU	TS062	NU	MJ0BM3	SD	0-7	KB	06/06/01	1130	X					0% gravel clay. Dark brow charcoal fragi
01234123	NU	TS063	JX803	MJ0BK3	SD	0-4	KB	06/08/01	1615	X	X	X			2% fine gravel 1 68% fine sand Frequent pine ne
01234127	NU	TS064	JX807	MJ0BK7	SD	0-3.5	SMF	06/08/01	1120	X	X	X			5% gravel, 75% grayish brown coarse sand and g Organics includi make up 20% of

Table 3-1 SAMPLE COLLECTION AND ANALYTICAL SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PI AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

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WESTON Samples (continued)															
01234125	NU	TS065	JX805	MJ0BK5	SD	0-1	SMF	06/08/01	1130	X	X	X			<1% gravel clay. Damp, include rootlet thick). No slag
01234126	NU	TS066	NU	MJ0BK6	SD	0-1.5	SMF	06/08/01	1245	X					0% gravel, 40% Saturated, grav H2S odor. Some
01234066	NU	TS067	JX567	MJ09G0	SD	0-2	KB	06/05/01	1345	X	X	X			10% fine gravel clay, brown, no other debris.
01234088	NU	TS068	NU	MJ0BK0	SD	0-1	KB	06/06/01	1030	X					10% fine gravel clay. Brown, no other debris.
01234092	NU	TS069	NU	MJ0BK4	SD	0-3	KB	06/05/01	1320	X					5% fine gravel, Light brown, no no other debris
01234089	NU	TS070	NU	MJ0BK1	SD	0-8	KB	06/05/01	1530	X					0% gravel, 90% brown, no odor o debris.

01234090	NU	TS071	NU	MJ0BK2	SD	0-2	KB	06/05/01	1600	X					0% gravel, 85% n clay, brown, no o other debris.
01234091	NU	TS072	JX568	MJ0BK3	SD	0-3	KB	06/05/01	1430	X	X	X			10% fine gravel, clay, brown, no o occasional twigs,
01234093	NU	TS073	NU	MJ0BK5	SD	0-3	KB	06/05/01	1145	X					0% gravel, 100% clay. Brown, no o other debris.
01234094	NU	TS074	NU	MJ0BK6	SD	0-5	KB	06/05/01	1100	X					15% fine gravel, 0% clay, grayish l no other debris.
01234095	NU	TS075	JX569	MJ0BK7	SD	0-2	KB	6/5/011	0945	X	X	X			0% gravel, 100% clay. Light brown material, possible debris.
01214101	NU	TS076	NU	MJ0952	SD	0-1	SF	05/21/01	1715	X					Silt with sand and 20% clay. Tan br plant material.
01214103	NU	TS077	NU	MJ0953	SD	0-1	SF	05/22/01	1045	X					0% gravel, 5% sa dark brown, roots
01214105	NU	TS078	NU	MJ0954	SD	0-1	SF	05/22/01	1345	X					15% gravel, 50% roots and bulbs (s

Table 3-1 SAMPLE COLLECTION AND ANALYTICAL SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PR AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

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WESTON Samples (continued)															
01214107	NU	TS079	NU	MJ0955	SD	0-1	SF	05/22/01	1455	X					15% gravel, 50% roots and bone fr
01214109	NU	TS080	NU	MJ0956	SD	0-1	SF	05/22/01	1550	X					Trace to 0% grav mica, some organ
01214111	NU	TS081	NU	MJ0957	SD	0-1	SF	05/22/01	1705	X					0% gravel, 30% f organics - leaves,
01214113	NU	TS082	NU	MJ0958	SD	0-1	SF	05/22/01	1735	X					Trace to 0% grav roots, etc.
01214115	NU	TS083	NU	MJ0959	SD	0-2	SF	05/23/01	1100	X					Trace to 0% grav organics.
01214117	NU	TS084	NU	MJ0960	SD	0-2	SF	05/23/01	1220	X					0% gravel, 95% s no odor, some org
01214119	NU	TS085	NU	MJ0961	SD	0-0.5	SF	05/23/01	1410	X					60% organics. 10 brown organics (r
01214121	NU	TS086	NU	MJ0962	SD	***	SF	05/23/01	1445	X					
01214123	NU	TS087	NU	MJ0963	SD	0-1	SF	05/23/01	1555	X					10% gravel, 60% organics (roots/le
01214125	NU	TS088	NU	MJ0964	SD	0-1	SF	05/23/01	1640	X					0% gravel, 60% s organics (roots, le
01214129	NU	TS089	NU	MJ0968	SD	0-2	SMF	05/23/01	1645	X					1% gravel, 90% s organic soil (no sl

01234137	NU	TS090	JX795	MJ0BJ5	SD	0-3	SMF	06/08/01	1645	X	X	X			<5% gravel (ang angular very coar clay. Saturated c including rootlet make up 20% or
01234143	NU	TS091	NU	MJ0BJ2	SD	0-6	SMF	06/08/01	1545	X					0% gravel, 70% s medium brown n rootlets and fine sample.

Table 3-1 SAMPLE COLLECTION AND ANALYTICAL SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PI AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	E & E Sample ID	Station Location ID	CLP Organic No.	CLP Inorganic No.	Matrix	Depth	Sampler	Date	Time	TAL Metals	Pesticide/ PCBs	TOC	VOCs	SVOCs	
WESTON Samples (continued)															
01234138	NU	TS092	JX796	MJ0BJ6	SD	0-1	SMF	06/08/01	1500	X	X	X			0% gravel, 60% c <10% clay. Satur brown. Minor or fragments, but al slag.
01214127	NU	TS093	NU	MJ0967	SD	0-2	SMF	05/24/01	1215	X					0% gravel, 50% s medium-dark bro
01214131	NU	TS094	NU	MJ0969	SD	0-2	SMF	05/24/01	1300	X					1% gravel as gra clay, moist, gray
01214133	NU	TS095	NU	MJ0970	SD	0-2	SMF	05/24/01	1345	X					0% gravel, 60% medium grayish
01234139	NU	TS096	JX797	MJ0BJ7	SD	0-5	KB	06/08/01	1145	X	X	X			5% fine gravel, 2 40% fine sand, 1 slag, occasional r
01214135	NU	TS097	NU	MJ0971	SD	0-3	SMF	05/24/01	1615	X					0% gravel, 40% dark gray, satura and grass. No s
01214137	NU	TS098	NU	MJ0972	SD	0-3	SF	05/24/01	1530	X					
01234140	NU	TS099	JX798	MJ0BJ8	SD	0-4	KB	06/08/01	1300	X	X	X			0% gravel, 2% c fine sand, 3% sil slag, occasion
01214139	NU	TS100	NU	MJ0973	SD	0-1.5	SF	05/24/01	1435	X					0% gravel ~60% brown, roots p
01234141	NU	TS101	JX799	MJ0BJ9	SD	0-4	KB	06/09/01	1030	X	X	X			3% fine gravel, 1 27% fine sand, 1 slag, 1% leaf debr other debris.
01214141	NU	TS102	NU	MJ0974	SD	0-1	SF	05/24/01	1325	X					0% gravel, 20% s and grasses, no o
01214143	NU	TS103	NU	MJ0975	SD	0-3	SF	05/24/01	1145	X					0% to trace grave limestone fragme organics.
01234142	NU	TS104	JX800	MJ0BK0	SD	0-2	KB	06/09/01	0930	X	X	X			1% fine gravel, 7 brown, no odor or 1% of sample, no

01234122	NU	TS105	JX802	MJ0BK2	SD	0-4	KB	06/08/01	1000	X	X	X			5% fine gravel, 1: silt, 0% clay. Ligl roots, no other de
01224153	NU	TS106	JX552	MJ0976	SD	0-2	SMF	05/31/01	1345	X	X	X			10% gravel (gran sand, 40% silt, 0% plant material. Nc

Table 3-1 SAMPLE COLLECTION AND ANALYTICAL SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PR AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	E & E Sample ID	Station Location ID	CLP Organic No.	CLP Inorganic No.	Matrix	Depth	Sampler	Date	Time	TAL Metals	Pesticide/ PCBs	TOC	VOCs	SVOCs	
WESTON Samples (continued)															
01224152	NU	TS107	NU	MJ0977	SD	0-4	SMF	05/31/01	1300	X					10% gravel (gran 30% silt, <10% cl rootlets and plant molluse
01224156	NU	TS108	JX553	MJ0978	SD	0-4.5	SMF	05/31/01	1545	X	X	X			0% gravel, 50% s grayish brown, ab odor, no observec
01224161	NU	TS109	JX554	MJ0979	SD	0-3	SMF	06/01/01	1100	X	X	X			5% gravel, 55% v silt, 10% clay. Sa and organics. No
01224165	NU	TS110	JX555	MJ0980	SD	0-8	SMF	06/01/01	1330	X	X	X			1% gravel, 85% s debris content an
01264068	NU	US001	JX827	MJ0BQ1	SD	0-3	KB	06/27/01	0900	X	X	X			10% fine gravel, 25% fine sand, 5% clasts. Occasional or other debris.
01264050	NU	US005	JX810	MJ0BN3	SD	0-3	KB	06/25/01	0945	X	X	X			3% fine gravel, 5 25% fine sand, 1(odor, slag, organi
01264051	NU	US006	JX811	MJ0BN4	SD	0-3	KB	06/25/01	1315	X	X	X			10% fine gravel, 10% fine sand, 5% odor, slag, organi
01264054	NU	US007	JX814	MJ0BN7	SD	0-4	KB	06/25/01	1445	X	X	X			0% gravel, 0% co fine sand, 40% sil slag. Scattered ro
01264055	NU	US008	JX815	MJ0BN8	SD	0-6	KB	06/25/01	1500	X	X	X			0% gravel, 75% f brown, no odor o debris.
01264053	NU	US009	JX813	MJ0BN6	SD	0-8	KB	06/25/01	1300	X	X	X			0% gravel, 5% co fine sand, 20% sil Occasional roots.
01264059	NU	US010	JX819	MJ0BP2	SD	0-4	KB	06/25/01	1215	X	X	X			15% fine gravel, 10% fine sand, 0% organics, or any c
01264062	NU	US011	JX822	MJ0BP5	SD	0-10	KB	06/26/01	1615	X	X	X			0% gravel, 0% sa slight organic odc roots and leaves
01264060	NU	US012	JX820	MJ0BP3	SD	0-1	KB	06/26/01	1230	X	X	X			0% gravel, 10% c fine sand, 5% silt. no organics, no ot

01264058	NU	US013	JX818	MJ0BP1	SD	0-4	KB	06/26/01	1000	X	X	X			10% fine gravel, 35% fine sand, 5? slag. No organics

Table 3-1 SAMPLE COLLECTION AND ANALYTICAL SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PI AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	E & E Sample ID	Station Location ID	CLP Organic No.	CLP Inorganic No.	Matrix	Depth	Sampler	Date	Time	TAL Metals	Pesticide/ PCBs	TOC	VOCs	SVOCs	
WESTON Samples (continued)															
01264069	NU	UW001	NU	MJ0BQ2	SW	0	KB	06/27/01	0930	X					
01264052	NU	UW004	NU	MJ0BN5	SW	0	KB	06/25/01	1345	X					
01264063	NU	UW005	NU	MJ0BP6	SW	0	KB	06/26/01	1600	X					
01264061	NU	UW006	NU	MJ0BP4	SW	0	KB	06/26/01	1245	X					
01264066	NU	UW007	NU	MJ0BP9	SW	0	KB	06/27/01	1645	X					

Key:

AD = Adit water.
AJ = Al Johnson.
AN = Anderson Calhoun Mine/Mill.
BK = Background.
BR = Black Rock Mine/Mill.
CG = Charlie Gregory.
CK = Copper King Mine.
CK = Creek.
CLP = Contract Laboratory Program.
CS = Columbia River sediment.
CW = Columbia River surface water.
DC = Deep Creek Mine.
DT = Daisy Mine.
DT = Ditch.
DW = Dan Weiss.
E & E = Ecology and Environment, Inc.
EP = Electric Point Mine/Mill
EPA = United States Environmental Protection Agency.
GG = Guy Gregory
GL = Gladstone Mine/Mill.
GW = Great Western Mine.
H2S = hydrogen sulfide
HZ = Howard Zorzi.
ID = Identification.
IR = Iroquois Mine.
JS = Jessica Spiegel.
KB = Kevin Broom.
LB = L-Bar Northwest Magnesite.
LC = Last Chance Mine/Mill.
ML = Melrose Mine.
NA = Neil Amick.
No. = Number.
NP = Napoleon Mine/Mill.
NS = LeRoi Northport Smelter.
NU = Not used.
PCBs = Polychlorinated biphenyls.
PP = Probable point of entry.
RD = Red Top Mine
RL = Ralph Lambert.
RN = Renee Nordeen.
RS = Rinsate of sampling equipment.
S = sulfur
SD = Sediment.
SF = Sonia Fernandez.
SL = Slag.
SMF = Susan FitzGerald.
SS = Stained soil.
SS = Surface soil.
SVOCs = Semivolatile Organic Compounds.
SW = Surface water.
SZ = Sierra Zinc Mine/Mill.
TAL = Target Analyte List.
TB = Trip blank.
TOC = Total Organic Carbon.
TP = Tailings pile.
TS = Tributary sediment (downstream sampling location).
US = Tributary sediment/soil (upstream/upland sampling location).
UW = Upland surface water
VOCs = Volatile Organic Compounds.
VS = Van Stone Mine/Mill.

MS = Mill soil.
MT = Monica Tonel.
MW = Mine pit water.
MW = Mark Woodke.
NA = Northwest Alloys.
WESTON = Roy F. Weston, Inc.
WP = Waste rock pile.

4. QUALITY ASSURANCE/QUALITY CONTROL

QA/QC data are necessary to determine precision and accuracy and to demonstrate the absence of interferences and/or contamination of sampling equipment, glassware, and reagents. Specific QC requirements for laboratory analyses are incorporated in the *Contract Laboratory Program Statement of Work for Organic Analyses* (EPA 1999) and in the *Contract Laboratory Program Statement of Work for Inorganic Analyses* (EPA 2000b). These QC requirements or equivalent requirements found in the analytical methods were followed for analytical work on the upper Columbia River Mines and Mills PAs and SIs project. This section describes the QA/QC measures taken and provides an evaluation of the usability of data presented in this report. The QA/QC data memorandums regarding the samples collected by WESTON can be found in the *Upper Columbia River/Lake Roosevelt Expanded Site Inspection Sampling and Quality Assurance Plan*, TDD: 01-02-0001-A, EPA Contract: 68-S0-01-02. Prepared for the EPA Region 10 by WESTON, May 2001.

All samples were collected following the guidance of the SQAP (E & E 2001) and the Sample Plan Alteration Forms for the field activities. Soil and water TAL metals analyses were performed at Sentinel, Inc., Huntsville, Alabama, a CLP laboratory, following CLP statement of work (SOW) ILM04.1. Soil SVOC and pesticide/PCBs analyses were performed at the EPA's Manchester Environmental Laboratory, Port Orchard, Washington, following EPA SW-846 Methods 8270 (SVOC analysis) and 8081/8082 (pesticide/PCBs analysis). Soil and water pesticide/PCBs analyses were performed at Envirosystems, Inc., Columbia, Maryland, a CLP laboratory, following CLP SOW OLM04.2. Soil and water SVOC and pesticide/PCBs analyses were performed at Mitkem Corporation, Warwick, Rhode Island, a CLP laboratory, following CLP SOW OLM04.2. Soil SVOC and pesticide/PCBs analyses were performed at Laucks Testing Laboratories, Inc., Seattle, Washington, a CLP laboratory, following CLP SOW OLM04.2. Sediment TOC analyses were performed by the E & E, Analytical Services Center, Lancaster, New York, a START-subcontracted commercial laboratory, following the Lloyd Kahn method.

Soil field screening for copper, lead, and zinc was performed in the field by Environmental Services Assistance T eam (ESAT) personnel following ESAT guidelines.

Data from the CLP laboratories were reviewed and validated by EPA and/or ESAT chemists. Data from the ST ART-subcontracted commercial laboratory were reviewed and validated by E & E chemists. Data qualifiers were applied as necessary according to the following guidance:

+ *EPA* (1990) *Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan and Data Validation Procedures*;
+ *EPA* (1994a) *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*; and
+ *EPA* (1999a) *Contract Laboratory Program National Functional Guidelines for Organic Data Review.*

In the absence of other QC guidance, method-specific QC limits were also utilized to apply qualifiers to the data. Copies of the data QA memoranda are included in Appendix D.

4.1 SATISFAC TIO N O F DATA Q UALITY O BJEC TIVES

T he following EPA (1994b) guidance document was used to establish data quality objectives (DQOs) for this project:

- *Data Quality Objectives Process for Superfund, Interim Final Guidance*, EPA 600-R-96-055.

T he EPA T ask Monitor (T M) determined that definitive data without error and bias det erminat ion would be used for t he sampling and analyses conduct ed during t he field act ivit ies. T he data quality achieved during the fieldwork produced sufficient data that meets the DQOs stated in the SQAP (E & E 2001). A detailed discussion of accomplished project objectives is presented in the following sections.

4.2 Q UALITY ASSURANC E/Q UALITY C O NTRO L SAMPLES

QA samples included rinsate blank samples. T rip blank samples were not collected as volatile organic compound analyses were not performed. Rinsate blank samples collected from sample collection equipment were submitted for the project. QC samples included matrix

spike/matrix spike duplicate (MS/MSD) samples for organic analyses or MS/duplicate samples for inorganic analyses at a rate of one MS/MSD or one MS/duplicate per 20 samples per matrix.

4.3 PROJECT-SPECIFIC DATA QUALITY OBJECTIVES

The laboratory data were reviewed to ensure that DQOs for the project were met. The following describes the laboratories' abilities to meet project DQOs for precision, accuracy, and completeness and the field team's ability to meet project DQOs for representativeness and comparability. The laboratories and the field team were able to meet DQOs for the project.

4.3.1 Precision

Precision measures the reproducibility of the sampling and analytical methodology. Laboratory and field precision is defined as the relative percent difference (RPD) between duplicate sample analyses. The laboratory duplicate samples or MS/MSD samples measure the precision of the analytical method.

The RPD values were reviewed for all commercial laboratory samples. A total of 161 sample results (approximately 1.5% of the data) were qualified as estimated quantities (J or UJ) based on laboratory duplicate QC outliers. The DQO for precision of 85% was met.

4.3.2 Accuracy

Accuracy measures the reproducibility of the sampling and analytical methodology. Laboratory accuracy is defined as the surrogate spike percent recovery (%R) for each SVOC or pesticide/PCBs analysis or the MS %Rs for all fixed laboratory analyses. The surrogate %R values were reviewed for all appropriate sample analyses. No sample results were qualified based on surrogate QC outliers.

The MS %R values were reviewed for all MS/MSD analyses. A total of 463 sample results (approximately 4.4% of the data) were qualified as estimated quantities (J) based on spike QC outliers. A total of 161 sample results (approximately 1.5% of the data) were rejected (R) based on spike QC outliers. Overall, the project DQO for accuracy of 85% was met.

4.3.3 Completeness

Data completeness is defined as the percentage of usable data (usable data divided

by t he t ot al possible dat a). All laboratory data were reviewed for dat a validat ion and usabilit y. A total of 29 sample results (approximately 0.2% of the data) were rejected (R), therefore the project DQO for completeness of 90% was met.

4.3.4 Representativeness

Data representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or environmental condition. T he number and selection of samples were determined in the field to account accurately for site variations and sample matrices. T he DQO for representativeness of 85% was met.

4.3.5 Comparability

Comparability is a qualit at ive parameter expressing the confidence with which one data set can be compared to another. Data produced for this site followed applicable field sampling techniques and specific analytical methodology. T he DQO for comparability was met .

4.4 LABO RATO RY Q UALITY ASSURANCE/Q UALITY CO NTRO L PARAMETERS

T he laboratory data also were reviewed for holding t imes and laboratory blank samples. T hese QA/QC parameters are summarized below. In general, the laboratory and field QA/QC parameters were considered acceptable.

4.4.1 Holding Times

A total of 4 sample results (approximately 0.04% of the data) were qualified as estimated quantities (J or UJ) based on holding time outliers.

4.4.2 Laboratory Blanks

All laboratory blanks met the frequency criteria. T he following potential COCs were detected in the laborat ory blanks resulting in qualifications:

SVOCs: bis(2-ethylhexyl)phthalate; and

T AL Metals: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium,

cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium,

sodium, silver, thallium, vanadium, and zinc.

Four SVOC results and 361 T AL metals results were qualified based on laboratory blank contamination. Associated sample results less than five times positive blank contamination (10 times for common laboratory contaminants) were qualified as not detected (U). Associated sample results less than five times the absolute value of negative T AL metals blank contamination were qualified as est imat ed quant it ies (J or UJ). T wo T OC result s were also qualified as not det ect ed (U) based on laboratory blank contamination. See Appendix D for results that were qualified based on laboratory blank contamination.

5. ANALYTIC AL RESULTS REPO RTING AND BAC KGRO UND SAMPLES

T his section describes the reporting criteria and reporting methods applied to EPA CLP analytical results presented in Sections 6 and 7 of this report. A discussion of background sample locat ions and results also is provided. A list of all samples collect ed for laborat ory analysis is presented in T able 3-1.

5.1 ANALYTIC AL RESULTS EVALUATIO N C RITERIA

Analytical results presented in the summary tables in Sections 6 and 7 show all analytes detected above laboratory detection limit s in bold t ype. Analytical results indicating significant concent rations of contaminants in source samples (Section 6) with respect to background concentrations are shown underlined and in bold type. Similarly, analytical results indicating elevated concentrations of contaminants in target samples (Section 7) with respect to background concentrations also are underlined and in bold type. For the purposes of this investigation,

significant/elevated concentrations are defined, using T able 2-3 of the EPA HRS model criteria for observed releases or observed contamination (significant or elevated concentrations) as follows.

+ Equal to or greater than the sample's Contract Required Quantitation Limit/Contract Required Detect ion Limit (CRQL/CRDL) or the sample quantit at ion limit (SQL) when a non-CLP laboratory was used; and
+ Equal to or greater than the background sample's CRQL/CRDL or SQL when the background concentration is below detection limits; or
+ At least three times greater than the background concentration when the background concentration equals or exceeds the detection limit.

T he analytical summary tables present all detected analytes, but only those detected analytes (specifically arsenic, cadmium, lead, mercury, and zinc) at potential sources or in targets meeting the significant/elevated concentration criteria are discussed in the report text. All detected concentrations are discussed for background samples, including those concentrations which were qualified as estimated because they were detected below the SQL (JB). Because both tailings and waste rock are unique soil waste matrices placed on surface soil, analytical results of the tailings and waste rock samples collected were compared to the results for background surface soil. T he background surface soil samples consisted of native soil.

T wo sediment samples were collected from the Kettle River (KRBK01SD and KRBK02SD). KRBK01SD was collected near the Box Canyon-Deep Creek Road along the Kettle River. KRBK02SD was collected along the bank of the Kettle River just south of the U.S.-Canada border. Since these samples were collected outside the project study area they will not be discussed in t his report . However, analytical results for these two samples are provided in Appendix E.

Analytical results are qualified as estimated (J) when the analyte is positively identified as either present or absent based on the QC data provided by the laboratory. T he associated numerical value is the approximate concentration of the analyte in the sample. Additional qualifiers were applied when necessary to indicate potential bias of estimated quantities including low, unknown, high, or when the result was estimated because it was below the SQL:

B = T he detected concentration is below the method reporting limit /CRDL, but is above the inst rument detection limit ;

H = The numerical result is likely biased high, above the actual concentration;

L = The numerical result is likely biased low, below the actual concentration;

K = The bias of the numerical value is unknown; and

Q = The detected concentration is below the method reporting limit /CRQL, but is above the method detection limit.

For comparison purposes, the SQL is provided in parenthesis for background results that are qualified because they are below the SQL. When samples were diluted for reanalysis at a laboratory, the dilution results were considered for evaluation and are provided in the tables. For target locations, only those analytes that also were detected in a source at the mine and mill sites were evaluat ed to determine whether their concentrations were elevated. All hazardous substances detected using EPA CLP results at target locations and meeting evaluation criteria can be used to document an observed release from the source at the mines and mills to the target.

Based on the EPA Region 10 policy, evaluation of the common earth crust elements (aluminum, calcium, iron, magnesium, potassium, and sodium) is generally employed only in water mass tracing, which is beyond the scope of this report. For this reason, these elements and results will not be discussed in this report, but are presented in the analytical results summary tables when detected.

5.2 BACKGRO UND SAMPLES

Background samples were collected for each of the naturally occurring medium from which samples were collected. T hose media are surface soil and sediment. A background surface water sample is not presented in this report since all surface water sample results discussed are from sources of contamination which do not require comparison to background concentrations. Results for the appropriate background sample(s) appear as the first column(s) in the analytical results summary tables in Sections 6 and 7 for comparison against source or target results.

5.2.1 Background Surface Soil

5.2.1.1 Sample Locations

Mine and mill-specific background surface soil samples were collected for the

Daisy Mine (DT BK01SS; Figure 6-2), the LeRoi/Northport Smelter (NSBK02SS; Figure 6-17), the Anderson Calhoun Mine/Mill (ANBK02SS; Figure 6-38), and the Van Stone Mine/Mill (US007, US008, and US009; Appendix H).

DT BK01SS was located approximately 60 feet north and upgradient from Daisy Mine. NSBK02SS was collected south of the LeRoi/Northport Smelter. ANBK02SS was located east and upgradient of the Anderson Calhoun Mine/Mill. US007, US008, and US009 were collected upgradient of the Van Stone Mine/Mill.

In addition, six background surface soil samples (BK01SS and BK04SS through BK08SS) were collected from locations within the general project area (Figure 3-1). Sample locations are listed in Table 3-1. BK01SS was located south of the Comfort Inn in Colville. BK04SS was located approximately 2.2 miles on Black Canyon Road, upgradient of mining activity. BK05SS was located approximately 200 yards off the unnamed road leading toward residences south of Deep Creek Mine. BK06SS was located approximately 1.5 miles upgradient from Magma Mine and near the unnamed road. BK07SS was located along Silver Creek Road. BK08SS was located upgradient from Iroquois Mine.

The surface soil samples were collected from 0 to 6 inches bgs. The matrix of the samples appeared similar to that of the native soil observed at the mines and mills.

For those mines and mills were site-specific background soil samples were unobtainable due to accessibility and safety concerns, background analyte concentrations for those mine and mill sites were established using the highest analyte concentration from all background soil samples collected. These assignments were determined by the EPA TM. Refer to Table 5-1.

Background concentrations of TAL metals, pesticide/PCBs, TOC, and SVOCs will be compared to source and target sample concentrations, as described in Sections 6 and 7. The purpose of the comparison is to determine if concentrations of substances found in source and target samples are significant/elevated with respect to background concentrations as defined, using the EPA HRS model criteria.

5.2.1.2 Sample Results

Refer to [illegible] for E & E and WEST ON sample results, respectively.

5.2.2 Background Sediment

5.2.2.1 Sample Locations

Seven background sediment locations were sampled within the project area. Sample locations are listed in Table 3-1.

LBBK01SD was located downstream of the confluence of Logan Road ditch and the unnamed ditch adjacent to L-Bar/Northwest Magnesite and reflects background concentrations for the West Ditch sampled at L-Bar/Northwest Magnesite. LBBK02SD was locat ed on t he Colville River near the Burlington Railroad and U.S. 395 and reflects background concentrations for the probable point of entry (PPE) sample to surface water at L-Bar/Northwest Magnesite [illegible].

NABK01SD was located on Stensgar Creek approximately 60 feet west of the confluence of Stensgar Creek and the Columbia River and reflects background concentrations for Stensgar Creek and the ditch sampled near Northwest Alloys. NABK02SD was located approximately 30 feet south of the confluence of Stensgar Creek and the Colville River and reflects background concent rations for t he Colville River sampled near Northwest Alloys [illegible].

NPBK01SD was located upstream and upgradient in the unnamed creek near Napoleon Mine/Mill and reflects background concent rations for t he unnamed creek sampled at Napoleon Mine/Mill (Figure 6-8).

NSBK01SD was located south of the LeRoi/Northport Smelter along the unnamed creek near Northport-Waneta Road and reflects background concentrations for the unnamed creek sampled at the LeRoi/Northport Smelter (Figure 6-17).

T he analytical results of a sediment sample collected in May of 2001 by Ecology at Lower Arrow Lake in Canada (sample number 01198040) will be used t o establish background concentrat ions for the sediment samples collected along the Columbia River

ANBK01SD was located approximately 200 yards south of the Anderson Calhoun Mine/Mill on the unnamed creek which flows through the site. ANBK01SD reflects background

concentrations for the unnamed creek sampled at the Anderson Calhoun Mine/Mill (Figure 6-38).

For those mine and mill sites where site-specific background sediment samples were unobtainable due to accessibility and safety concerns, background analyte concentrations were established using the highest analyte concentration from all background sediment samples collected. These assignments were determined by the EPA TM. Refer to Table 5-2.

Sediment samples were collected at the following locations by WESTON (Appendix H):

+ Tributary to Tom Bush Creek and Melrose Mine (US001);
+ Unnamed tributary to Onion Creek and Van Stone Mine/Mill (US005);
+ Unnamed tributary to Onion Creek and Van Stone Mine/Mill (US006);
+ Unnamed tributary to Onion Creek and Van Stone Mine/Mill (US010);
+ Tributary to Black Rock Mine/Mill, Great Western Mine, and Last Chance Mine/Mill approximately 1 mile upgradient and across Deep Creek Mine (US011);
+ Deep Creek South Fork approximately 7 miles upstream for Copper King Mine and Sierra Zinc Mine/Mill (US012); and
+ Unnamed tributary to Deep Creek (US013).

5.2.2.2 Sample Results

Refer to Table 5-2 and 5-3 for E & E and WESTON sediment sample results, respectively.

PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON Table 5-1 SURFACE SOIL BACKGROUND SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS

EPA Sample ID	01374163	01374188	01374189	01264251	01264275	01264276	01264279	012642
CLP Inorganic ID	MJ0KH2	MJ0KK6	MJ0KK7	MJ0EZ6	MJ0F21	MJ0F22	MJ0F25	MJ0F
CLP Organic ID	NU	NU	NU	J0EZ6	NU	NU	NU	NU
E & E Sample ID	NU	NU	NU	NU	NU	NU	NU	NU
Station Location	DTBK01SS	NSBK02SS	ANBK02SS	BK01SS	BK04SS	BK05SS	BK06SS	BK07S
Sample Depth (inches)	0-6	0-6	0-6	0-6	0-6	0-6	0-6	0-6
TAL Metals (mg/kg)								
Aluminum	18100	4810	16400	14200	11100	13500	9330	10200
Antimony	1.9 JB (12.7 SQL)	1.5 JB (15.1 SQL)	2.8 JB (13.1 SQL)	0.62 UJK	3.4 U	1.3 U	1.2 U	1.3 U
Arsenic	68.2	2.6 JL	8.3 JL	6.9	7.3	2.4 JB (2.5 SQL)	1.1 JB (2.3 SQL)	4.9
Barium	168	194	470	265	548	273	93.4	108
Beryllium	0.89 JB (1.06 SQL)	0.09 JB (1.3 SQL)	0.31 JB (1.1 SQL)	0.62 JB (1.0 SQL)	0.38 JB (1.4 SQL)	0.48 JB (6.3 SQL)	0.32 JB (1.2 SQL)	0.34 JB (SQL)
Cadmium	4.8	1.3	3.4	0.06 U	7.8	0.47 JB (6.3 SQL)	0.05 U	0.48 JB (SQL)
Calcium	5420	90500 JK	8210 JK	24300	4500	3290	1140 JB	91600
Chromium	13.9	17.6	16.5	29.0	20.9	16.1	5.6	13.8

Cobalt	14.7	2.9 JB (12.6 SQL)	6.0 JB (10.9 SQL)	10.1 JB (10.3 SQL)	9.3 JB (14.1 SQL)	8.6 JB (63 SQL)	3.0 JB (11.8 SQL)	6.9 JB (1 SQL)
Copper	55.2	17.3	11.8	31.0 JL	47.4 JL	9.4 JL	7.5 JL	20.0 J
Iron	25200	7690	19602	24700	23400	17800	9490	1800
Lead	183	57.0	152	17.4	27.5	27.8	6.8	24.6
Magnesium	4110	3520	4160	11700	5470	4020	1540	1790
Manganese	1070	152	922	597	370	1370	151	354
Mercury	0.06 JB (0.11 SQL)	0.06 U	0.05 U	0.05 U	0.07 U	0.06 U	0.05 U	0.06 U
Nickel	16.1	8.0 JB (10.1 SQL)	14.4	33.8	58.4	14.3	4.9 JB (9.4 SQL)	21.1
Potassium	1300 JK	897 JB	11660	2930	2610	2770	1000 JB	1690
Selenium	1.5 JL	1.1 JB (1.3 SQL)	0.74 U	0.70 U	2.4 U	0.86 U	0.79 U	0.83 U
Silver	6.7	0.57 JB (2.5 SQL)	1.3 JB (2.2 SQL)	0.91 JB (2.1 SQL)	1.6 JB (2.8 SQL)	0.75 U	0.46 JB (2.4 SQL)	0.63 JB (SQL)
Sodium	129 JB	255 JB	201 JB	216 JB	318 JB	369 JB	269 JB	377 JI
Thallium	1.1 U	1.3 U	1.1 U	0.80 UJK	1.4 U	1.3 U	1.2 U	1.2 U
Vanadium	41.9	13.8	27.4	51.2	50.8	22.9	18.2	26.4
Zinc	462	60.9	835	115 JH	502	110	30.1	81.8

PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON Table 5-1 SURFACE SOIL BACKGROUND SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS

EPA Sample ID	**01374163**	**01374188**	**01374189**	**01264251**	**01264275**	**01264276**	**01264279**	**012642**
CLP Inorganic ID	**MJ0KH2**	**MJ0KK6**	**MJ0KK7**	**MJ0EZ6**	**MJ0F21**	**MJ0F22**	**MJ0F25**	**MJ0F**
CLP Organic ID	NU	NU	NU	J0EZ6	NU	NU	NU	NU
E & E Sample ID	NU	NU	NU	NU	NU	NU	NU	NU
Station Location	**DTBK01SS**	**NSBK02SS**	**ANBK02SS**	**BK01SS**	**BK04SS**	**BK05SS**	**BK06SS**	**BK07**
Sample Depth (inches)	**0-6**	**0-6**	**0-6**	**0-6**	**0-6**	**0-6**	**0-6**	**0-6**
Pesticide/PCBs (mg/kg)								
4,4'-DDD	NU	NU	NU	3.5 U	NU	NU	NU	NU
4,4'-DDE	NU	NU	NU	3.5 U	NU	NU	NU	NU
4,4'-DDT	NU	NU	NU	3.5 U	NU	NU	NU	NU
Aldrin	NU	NU	NU	1.8 U	NU	NU	NU	NU
Alpha-BHC	NU	NU	NU	1.8 U	NU	NU	NU	NU
Alpha-Chlordane	NU	NU	NU	1.8 U	NU	NU	NU	NU
Aroclor-1016	NU	NU	NU	35 U	NU	NU	NU	NU
Aroclor-1221	NU	NU	NU	71 U	NU	NU	NU	NU
Aroclor-1232	NU	NU	NU	35 U	NU	NU	NU	NU
Aroclor-1242	NU	NU	NU	35 U	NU	NU	NU	NU
Aroclor-1248	NU	NU	NU	35 U	NU	NU	NU	NU
Aroclor-1254	NU	NU	NU	35 U	NU	NU	NU	NU
Aroclor-1260	NU	NU	NU	35 U	NU	NU	NU	NU
Beta-BHC	NU	NU	NU	1.8 U	NU	NU	NU	NU
Delta-BHC	NU	NU	NU	1.8 U	NU	NU	NU	NU
Dieldrin	NU	NU	NU	3.5 U	NU	NU	NU	NU
Endosulfan I	NU	NU	NU	1.8 U	NU	NU	NU	NU

Endosulfan II	NU	NU	NU	3.5 U	NU	NU	NU	NU
Endosulfan Sulfate	NU	NU	NU	3.5 U	NU	NU	NU	NU
Endrin	NU	NU	NU	3.5 U	NU	NU	NU	NU
Endrin Aldehyde	NU	NU	NU	3.5 U	NU	NU	NU	NU
Endrin Ketone	NU	NU	NU	3.5 U	NU	NU	NU	NU
Gamma-BHC(Lindane)	NU	NU	NU	1.8 U	NU	NU	NU	NU
Gamma-Chlordane	NU	NU	NU	1.8 U	NU	NU	NU	NU
Heptachlor	NU	NU	NU	1.8 U	NU	NU	NU	NU
Heptachlor Epoxide	NU	NU	NU	1.8 U	NU	NU	NU	NU
Methoxychlor	NU	NU	NU	18 U	NU	NU	NU	NU
Toxaphene	NU	NU	NU	180 U	NU	NU	NU	NU

Note: Bold type indicates sample concentration is above the detection limit.

Key:

AN = Anderson/Calhoun Mine/Mill.
B = The reported concentration is between the instrument detection limit and the contract required detection limit.
BK = Background.
CLP = Contract Laboratory Program.
DT = Daisy Mine.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
H = High bias.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
mg/kg = Milligrams per kilogram.
µg/kg = Micrograms per kilogram.
NS = LeRoi/Northport Smelter.
NU = Not utilized.
PCBs = Polychlorinated biphenyls.
SQL = Sample quantitation limit.
SS = Surface soil.
TAL = Target Analyte List.
U = The analyte was not detected. The associated numerical value is the contract required detection limit.

PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON Table 5-2 SEDIMENT BACKGROUND SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS

EPA Sample ID	**01374104**	**01374111**	**01374108**	**01374109**	**01374114**	**01374187**	**01374181**	
CLP Inorganic ID	**MJ0KC4**	**MJ0KD2**	**MJ0KC8**	**MJ0KC9**	**MJ0KD5**	**MJ0KK5**	**MJ0KJ5**	
CLP Organic ID	**J0KC4**	**J0KD2**	**J0KC8**	**J0KC9**	**J0KD4**	**J0KJ3**	**J0KH3**	Highest
E & E Sample ID	**01090404**	**01030411**	**01090408**	**01090409**	**01090413**	**01090432**	**01090427**	Backgroun
Station Location	**LBBK01SD**	**LBBK02SD**	**NABK01SD**	**NABK02SD**	**NPBK01SD**	**NSBK01SD**	**ANBK01SD**	Concentratic
Sample Depth (inches)	**0-8**	**0-8**	**0-8**	**0-8**	**0-8**	**0-8**	**0-6**	
TAL Metals (mg/kg)								
Aluminum	**20200**	**3960**	**2080**	**13100**	**6980**	**2740**	**4070**	**20200**
Antimony	1.3 JB (12.3 SQL)	0.85 JB (14.9 SQL)	0.71 U	0.86 U	1.0 JB (12.8 SQL)	0.73 UJL	2.1 U	0.85 JB (1 SQL)

Arsenic	12.1	2.8	1.1 UJK	4.3 JK	13.0	1.2 UJL	2.7 JB (3.3 SQL)	13.0
Barium	450	63.0	34.0 JB (48.8 SQL)	205	83.2	145	101	450
Beryllium	0.63 JB (1.0 SQL)	0.10 U	0.08 U	0.45 JB (1.49 SQL)	0.23 JB (1.07 SQL)	0.03 JB (1.3 SQL)	0.27 U	0.45 JB (1.49 SQL)
Cadmium	3.4	0.05 U	0.05 U	0.06 UJK	0.04 UJK	0.26 JB (1.3 SQL)	1.2 JB (1.7 SQL)	3.4
Calcium	39600	5740	2730	4940	56700	90700 JK	109000	109000
Chromium	32.3	6.8	5.4	24.7	22.0	7.6	9.9	32.3
Cobalt	11.9	4.7 JB (12.4 SQL)	2.2 JB (12.2 SQL)	10.5 JB (14.9 SQL)	5.9 JB (10.7 SQL)	1.7 JB (12.6 SQL)	2.6 JB (16.7 SQL)	11.9
Copper	69.3	6.5	2.8 JB (6.1 SQL)	21.3 JK	47.6	6.8	6.9 JB (8.3 SQL)	69.3
Iron	27900	10200	5590	27900	20300	6560	9200	27900
Lead	124	4.5	2.0	13.8	13.1	16.6	15.3 JK	124
Magnesium	33500	3720	1430	6940	4660	2600	3780	33500
Manganese	673	144	91.7	507	293	87.3	239	673
Mercury	0.10 JB (0.102 SQL)	0.06 U	0.06 U	0.07 U	0.05 U	0.06 U	0.08 U	0.10 JB (0.10 SQL)
Nickel	31.9	7.0 JB (9.9 SQL)	3.6 JB (9.8 SQL)	25.4	18.9	4.1 JB (10.1 SQL)	10.8 JB (13.4 SQL)	31.9
Potassium	3920 JK	603 JB	605 JB	2550 JK	899 JB	485 JB	410 JB	3920 JK
Selenium	0.70 UJL	0.84 UJL	0.83 UJL	1.0 U	0.72 UJL	0.86 U	1.4 JB (1.7 SQL)	1.4 JB (1.7 SQL)
Silver	1.5 JB (2.04 SQL)	0.74 JB (2.5 SQL)	0.30 U	1.8 JB (3.0 SQL)	1.1 JB (2.1 SQL)	0.15 U	1.0 U	1.8 JB (3.0 SQL)
Sodium	597 JB	162 JB	151 JB	229 JB	155 JB	175 JB	557 JB	597 JB
Thallium	1.0 U	1.3 U	1.2 U	1.5 U	1.1 U	1.3 U	0.67 U	1.5 U
Vanadium	47.4	10.9 JB (12.4 SQL)	8.9 JB (12.2 SQL)	36.9	25.8	14.6	15.9 JB (16.7 SQL)	47.4
Zinc	239	26.5	10.8	78.2	62.2	26.4	76.3	239

PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON Table 5-2 SEDIMENT BACKGROUND SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS

EPA Sample ID	**01374104**	**01374111**	**01374108**	**01374109**	**01374114**	**01374187**	**01374181**	
CLP Inorganic ID	**MJ0KC4**	**MJ0KD2**	**MJ0KC8**	**MJ0KC9**	**MJ0KD5**	**MJ0KK5**	**MJ0KJ5**	
CLP Organic ID	**J0KC4**	**J0KD2**	**J0KC8**	**J0KC9**	**J0KD4**	**J0KJ3**	**J0KH3**	**Highest**
E & E Sample ID	**01090404**	**01030411**	**01090408**	**01090409**	**01090413**	**01090432**	**01090427**	**Backgroun**
Station Location	**LBBK01SD**	**LBBK02SD**	**NABK01SD**	**NABK02SD**	**NPBK01SD**	**NSBK01SD**	**ANBK01SD**	**Concentratic**
Sample Depth (inches)	**0-8**	**0-8**	**0-8**	**0-8**	**0-8**	**0-8**	**0-6**	
Pesticide/PCBs (mg/kg)								
4,4'-DDD	3.5 U	4.0 U	3.8 U	5.3 U	3.6 U	4.2 U	5.1 U	5.3 U
4,4'-DDE	3.5 U	4.0 U	3.8 U	5.3 U	3.6 U	4.2 U	5.1 U	5.3 U
4,4'-DDT	3.5 U	4.0 U	3.8 U	5.3 U	3.6 U	4.2 U	5.1 U	5.3 U
Aldrin	1.8 U	2.1 U	2.0 U	2.7 U	1.9 U	2.2 U	2.6 U	2.7 U
Alpha-BHC	1.8 U	2.1 U	2.0 U	2.7 U	1.9 U	2.2 U	2.6 U	2.7 U
Alpha-Chlordane	1.8 U	2.1 U	2.0 U	2.7 U	1.9 U	2.2 U	2.6 U	2.7 U
Aroclor-1016	35 U	40 U	38 U	53 U	36 U	42 U	51 U	53 U
Aroclor-1221	71 U	82 U	78 U	110 U	74 U	86 U	100 U	110 U
Aroclor-1232	35 U	40 U	38 U	53 U	36 U	42 U	51 U	53 U

Aroclor-1242	35 U	40 U	38 U	53 U	36 U	42 U	51 U	53 U
Aroclor-1248	35 U	40 U	38 U	53 U	36 U	42 U	51 U	53 U
Aroclor-1254	35 U	40 U	38 U	53 U	36 U	42 U	51 U	53 U
Aroclor-1260	35 U	40 U	38 U	53 U	36 U	42 U	51 U	53 U
Beta-BHC	1.8 U	2.1 U	2.0 U	2.7 U	1.9 U	2.2 U	2.6 U	2.7 U
Delta-BHC	1.8 U	2.1 U	2.0 U	2.7 U	1.9 U	2.2 U	2.6 U	2.7 U
Dieldrin	3.5 U	4.0 U	3.8 U	5.3 U	3.6 U	4.2 U	5.1 U	5.3 U
Endosulfan I	1.8 U	2.1 U	2.0 U	2.7 U	1.9 U	2.2 U	2.6 U	2.7 U
Endosulfan II	3.5 U	4.0 U	3.8 U	5.3 U	3.6 U	4.2 U	5.1 U	5.3 U
Endosulfan Sulfate	3.5 U	4.0 U	3.8 U	5.3 U	3.6 U	4.2 U	5.1 U	5.3 U
Endrin	3.5 U	4.0 U	3.8 U	5.3 U	3.6 U	4.2 U	5.1 U	5.3 U
Endrin Aldehyde	3.5 U	4.0 U	3.8 U	5.3 U	3.6 U	4.2 U	5.1 U	5.3 U
Endrin Ketone	**4.0**	4.0 U	3.8 U	5.3 U	3.6 U	4.2 U	5.1 U	**4.0**
Gamma-BHC(Lindane)	1.8 U	2.1 U	2.0 U	2.7 U	1.9 U	2.2 U	2.6 U	2.7 U
Gamma-Chlordane	1.8 U	2.1 U	2.0 U	2.7 U	1.9 U	2.2 U	2.6 U	2.7 U
Heptachlor	2.0 U	2.1 U	2.0 U	2.7 U	1.9 U	2.2 U	2.6 U	2.7 U
Heptachlor Epoxide	1.8 U	2.1 U	2.0 U	2.7 U	1.9 U	2.2 U	2.6 U	2.7 U
Methoxychlor	18 U	21 U	20 U	27 U	19 U	22 U	26 U	27 U
Toxaphene	180 U	210 U	200 U	270 U	190 U	220 U	260 U	270 U

Note: Bold type indicates sample concentration is above the detection limit

Key:

AN = Anderson/Calhoun Mine/Mill.
B = The reported concentration is between the instrument detection limit and the contract required detection limit.
BK = Background.
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
KR = Kettle River.
L = Low bias.
LB = L-Bar.
mg/kg = Milligrams per kilogram.
µg/kg = Micrograms per kilogram.
NA = Northwest Alloys.
NP = Napoleon Mine.
NS = Northport Smelter.
NU = Not utilized.
PCBs = Polychlorinated biphenyls.
SD = Sediment.
SQL = Sample quantitation limit.
TAL = Target analyte list.
U = The analyte was not detected. The associated numerical value is the contract required detection limit.

PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON Table 5-3 ROY F. WESTON, INC. BACKGROUND SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS

EPA Sample ID	01264068	01264070	01264073	01264075	01264050	01264051	01264054	01264055	01264053
CLP Inorganic ID	MJ0BQ1	MJ0BQ3	MJ0BQ5	MJ0BQ7	MJ0BN3	MJ0BN4	MJ0BN7	MJ0BN8	MJ0BN6
CLP Organic ID	JX827	JX829	JX831	JX832	JX810	JX811	JX814	JX815	JX813
WESTON Sample ID	BK-150-SD	BK-152-SD	BK-153-SD	BK-155-SD	BK-130-SD	BK-131-SD	BK-134-SD	BK-135-SD	BK-133-SD
Station Location	*US001*	*US002*	*US003*	*US004*	*US005*	*US006*	*US007*	*US008*	*US009*
Sample Depth (inches)	0-3	0-2	0-4	0-2	0-3	0-3	0-4	0-6	0-8
TAL Metals (mg/kg)									
Arsenic	6.7	1.5 JB	0.47 U	2.6	1.9 JB	1.3 JB	4.5	7	1.5 JB
Cadmium	46.2 JK	0.35 JB	0.05 UJK	0.38 JB	0.06 JB	0.05 UJK	0.28 JB	3.3 JK	0.05 UJK
Lead	20.3	6.4	5	14.8	2.7	8	19.2	139	8.4
Mercury	0.08 U	0.08 U	0.06 U	0.06 U	0.07 U	0.06 U	0.07 U	0.07 U	0.06 U
Zinc	1880	60	49	54.7	18.3	20	135	901	80.6

Note Bold type indicates sample concentration is below the detection limit.

Key:

B = Detected inorganic concentration is below the method reporting limit/Contract Required Detection Limit (CRDL) but is above the instrument detection limit.
BK = Background
CLP = Contract Laboratory Program.
EPA = United States Environmental Protection Agency.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
mg/kg = Milligrams per kilogram
R = The sample results are rejected (analyte may or may not be present) due to gross deficiencies in quality control criteria. Any reported value is unusable. Resampling and/or reanalysis is nec
SD = Sediment.
TAL = Target Analyte List.
U = The analyte was not detected. The associated numerical value is the contract required detection limit

WESTON = Roy F. Weston, Inc.

6. MINES AND MILLS, LO CATIO NS/DESCRIPTIO NS, START-2 VISITS

T his section identifies the mines and mills visited by EPA and the ST ART-2 personnel as part of this field event. T he mines and mills are presented in order of location relative to the upper Columbia River and its tributaries, beginning near Inchelium, Washington, continuing upstream along the river to the U.S.-Canada border. Mine and mill location, historical information, description, and ownership information are presented for each mine and mill. T his section also presents field observations for the ST ART-2 contractor and/or EPA personnel during the visits (Figures 6-1 through 6-42). For the 18 mines and mills where sampling was conducted,

analytical results are presented in this section.

6.1 DAISY MINE

6.1.1 Mine Location

Latitude:	48 22' 45.80"N
Longitude:	118 4' 42.60"W
Legal Description:	SW¼ Section 7, T ownship 33N, Range 38E
CERCLIS ID:	WAN001002371
County:	Stevens
Contact:	Martha J. Kernohan, CPL Boise Cascade Corp. Mineral Resources 1111 West Jefferson St. Boise, Idaho 83728-0001 (208) 384-7529

6.1.2 Historical Information

T he Daisy Mine is a former copper, lead, gold, and silver mine (Derkey et al. 1990). T he mine is located 25 miles west of Addy near the summit on Huckleberry Mountain, Washington (Battien 1998). T he mine also is reported to have produced between 1916 and 1935 (Derkey et al. 1990). It is reported that the presence of arsenic prompted the closure of the mine (Battien 1998). T he mine claim was located in 1887, but with almost impassable roads and lack of transportation the claim was not developed until 1905 when J.J. Browne and W.E. Seelye of Spokane took over the property (Battien 1998). Historical ownership from this time to the present is unknown.

6.1.3 Mine Description/Features

T he Daisy mine is located on the west slope of the Huckleberry Range in the Kettle Falls mining district. Alternate names are Daisy-T empest and Silver Mountain. T he mine consisted of 16 claims and additional property encompassing approximately 580 acres. T he mine deposit consists of at least four quartz veins from a few inches to 12 feet in width cut by a series of argillites and quartzites intruded by diorite. T he mine is developed by four adits and a shaft. (Huntting 1956)

6.1.4 START-2 Mine Visit

On September 10, 2001, the ST ART-2 visited the Daisy Mine and conducted a visual inspection of the property and surrounding area (Figure 6-1; Appendix A, Photos 43-1 through 43-21; Appendix B, T eam 2 Phase 2, Pages 2 through 7). T he mine area contained a tailings pile measuring 150 feet at the base, 30 feet in height with a slope of approximately 35%, and a depth of approximately 45 feet. A storage shed was located north of the tailings pile measuring 10 feet by 10 feet. East of the tailings pile and dirt road were an old office building, an outhouse, and a shed. North of the tailings pile and storage shed were the remnants of a building or shed. West of the remnants a shaft was located measuring 10 feet by 10 feet by unknown depth. A wet area originating from the shaft extended south approximately 25 feet. A depression south of the wet area was noted where potential pooling of water from the shaft would occur; continuing on to flow into a ditch (PPE 1), through a culvert, and into Magee Creek located southwest of the site. T he overland distance from the shaft to the creek is approximately 70 feet. Access to the mine is unrestricted. Logging occurs in the vicinity of the mine. No livestock grazing was noted in the vicinity of the mine.

6.1.5 Sampling Locations

Sample locations are depicted in Figure 6-2. T hree tailings samples (DTT P01SS, DTT P02SS, and DT T P03SS) were collected from the tailings pile adjacent to Daisy Mine Road. T he samples were collected within the overland surface water drainage routes identified by the ST ART -2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to consist of silty sand. No odor or staining was noted during sample collection.

One surface water sample (DT AD01SW) was collected from the shaft. T he sample was collected within the overland surface water drainage route identified by the ST ART-2. T he sample was collected to determine potential contamination associated with this source. T he sample was clear. No odor or staining was noted during sample collection.

A sediment sample (DT PP01SD) was collected at PPE 1 in the ditch near the culvert on the southern portion of the mine area.

6.1.6 Analytical Results

6.1.6.1 Surface Soil Sample Results

T he ST ART-2 collected three surface soil samples from tailings for T AL met als analyses. Arsenic was detected at a significant concentration of 233 milligrams per kilogram (mg/kg). Significant concentrations ranged from 0.42 mg/kg to 2.9 mg/kg for mercury. Refer to T able 6-1 for complete data result s.

6.1.6.2 Surface Water Sample Results

T he ST ART-2 collected one surface water sample from the shaft water for T AL metals analysis. Analytes detected in DT AD01SW include arsenic (95.3 micrograms per liter [.g/L]), cadmium
(7.1 .g/L), lead (5.2 .g/L), and zinc (829 .g/L). Copper and mercury were not detected.

6.1.6.3 Sediment Sample Results

T he ST ART-2 collected one sediment sample from PPE 1 for T AL metals, pesticide/PCBs, and T OC analyses. No elevated concentrations were detected. Refer to T able 6-2 for complete data results.

6.2 L-BAR/NO RTHWEST MAGNESITE

6.2. Plant Location
1

Latitude:	48 15' 21.94"N
Longitude:	117 43' 6.25"W
Legal Description:	Section 23, T ownship 32N, Range 40E
CERCLIS ID:	WAD097824577
County:	Stevens

Contact: Ozzie Wilkinson
Northwest Alloys, Inc.

P.O. Box 115 1560 A Marble Valley Road Addy,
Washington 99101-0115 (509) 935-3369

Northwest Magnesite Contact: William and Richard Brauner (magnesite residue pile

only)

6.2.2 Historical Information

L-Bar/Northwest Magnesite is located approximately two miles south of Chewelah, Washington on the west side of U.S. Highway 395, and lies on the south bank of the Colville River (CH2MHill 2001a, Ecology 2001). Northwest Magnesite is a former magnesite plant created in 1916 by American Mineral Production Company (Battien 1998). Shipments of crude magnesite from Stevens County averaged 700 tons daily (Battien 1998). T he plant was closed down in 1968 (Battien 1998).

L-Bar/Northwest Magnesite includes an industrial area covering approximately 80 acres and an adjoining 17-acre agricultural field located between the industrial area and the Colville River in the Colville River valley (Ecology 2001). An above-grade magnesite residue pile, approximately 30 feet deep and 17 acres in area, is found to the west (Ecology 2001). T wo ditches, the Main Ditch and the West Ditch, run through the site. Both ditches previously discharged into the Colville River.

L-Bar/Northwest Magnesite and the adjacent parcel to the south have been associated with magnesium processing since the 1930s. Large quantities of magnesite ore were processed and flue dust and other materials were stockpiled on site until 1967. In the mid-1970s, the facility was converted to recover magnesium from a magnesium processing byproduct commonly referred to as flux bar. Flux bar was supplied primarily by Northwest Alloys, Inc., from their magnesium plant near Addy, Washington, and sold to the site owners. T he magnesium recovery facility was owned and operated by Phoenix Resources Recovery, Inc., from 1977 to 1986. L-Bar Products, Inc., operated the facility from 1986 to 1991 when it closed down due to insolvency (CH2MHill 2001a). More than 100,000 tons of materials (under a covered pile, in buildings, and on top of the magnesite pile) remained at the site after closure (Ecology 2001).

Ownership of a majority of the L-Bar property was transferred from the L-Bar Bankruptcy T rustee to Northwest Alloys, Inc., in May 2000. T he transfer included all former L-Bar Products, Inc., real estate except those portions lying under the south half of the magnesite residue pile, which were retained by the L-Bar trustee, and later transferred to Richard and Maxine Brauner. T he north half of the magnesite pile and the underlying property is owned by William Brauner. Easements are in place in the

existing deeds that grant Northwest Alloys, Inc., and its agents access to the magnesite pile for purposes of groundwater monitoring and future remedial act ions, if needed. (CH2MHill 2001a)

Since 1995, discharge from the Main Ditch has stopped as a result of actions taken by Northwest Alloys, Inc. In response to an Emergency Enforcement Order issued by Ecology in 1994, Northwest Alloys, Inc., constructed a water retention structure that eliminated direct discharge of Main Ditch surface water to the Colville River. (Ecology 2001)

In 1995, Ecology and Northwest Alloys, Inc., entered into an Agreed Order to conduct interim act ions, a remedial investigation (RI), and a feasibility study. Interim act ions conducted included: management of stored waters in the evaporation pond (through land application in the North Field during the summer months) and the removal and disposal of approximately 65,000 tons of flux bar and flux bar residue from atop and around the magnesite residue pile. (Ecology 2001)

Findings in the RI completed in 1998 show that flux bar and flux bar residue materials are the primary source of ammonia, chloride, and total dissolved solids detected in the shallow groundwater, soils, and in surface water in two on-site ditches. T he shallow groundwater is not a drinking water aquifer; however, it discharges to the Colville River which has been cat egorized by Ecology as a Class A (excellent) surface water body. T he West Ditch also discharges to the Colville River. River sampling showed a slight increase in ammonia and chloride concentrations when comparing upstream to downstream results. However, Class A surface water criteria have not been exceeded in the river. (Ecology 2001)

Ecology prepared a draft Cleanup Action Plan that became final in June 2000. T he cleanup actions selected by Ecology are source removal, monitoring, and institutional controls. With source removal, contaminants in groundwater, surface water, and soils are expected to be reduced over time through natural attenuation. (Ecology 2001)

6.2.3 Plant Description/Features

T he magnesite pile is believed to consist predominantly of magnesium carbonate derived from Finch, Red Marble, and Keystone quarries several miles west of the site.

Processed (washed and crushed) magnesite ore was delivered to the Northwest Magnesit e reduct ion facilit y via a 5-mile-long aerial tramway. Electrostatic precipitate (ESP) dust from the site and perhaps other materials were hydraulically placed into portions of the existing magnesite stockpile. A Washington State Department of T ransportation aerial photo of the site in July 1966 shows the placement of the ESP dust by flume discharge from the plant into a dike retaining pond system in the pile area. (CH2MHill 1998)

In addition to magnesite processing, a fireproof fiber-board product called T hermax was manufactured at the site before L-Bar operations commenced. T he T hermax fiber boards consisted of shredded cottonwood impregnated with magnesite. Little is known about the operation; however, many of the older L-Bar buildings are constructed of T hermax. T hermax debris is found as a waste material mixed into the magnesit e stockpile. (CH2MHill 1998)

Past operating practices and inadequate storage of flux bar and flux bar residue have resulted in elevated levels of mostly chloride and ammonia in shallow groundwater and surface water. Most of the materials remaining on the plant have continued to leach salts and ammonia into shallow groundwater and surface water in two ditches. (Ecology 2001)

T o date, 140,000 to 150,000 tons of flux bar related material has been removed from the property. T here is an estimated 30,000 to 40,000 tons of material still is present on site. Removal of this material and backfilling are t asked t o be complet e by 2002. T hese activities are being conducted under an Agreed Order with Ecology (Wilkinson 2002).

Result s from t he *Draft Interim Action Materials Characterization Report* (1996) produced by Cascade Earth Sciences (CES) for Northwest Alloys Inc. showed the magnesite residue pile contained elevated levels of some trace metal and semi-metallic const ituent s including arsenic, boron, cadmium, copper, selenium, and zinc. Concentrations of these constituents in the magnesite residue pile were elevated in comparison to both regional background soil levels for eastern Washington and to levels measured in L-Bar flux bar residue. (CH2MHill 1998)

Sediment samples were collected during Phase I of the RI from six locations: three in the Main Ditch, two in the West Ditch, and one from the Logan Road ditch south of the property. Review of trace metals analytical results demonstrated that barium, manganese, and selenium concentrations in the Main Ditch sediment samples exceeded the concentrations

detected in the background sample collected from the Logan Road ditch south of the property. T race metals results from the West Ditch samples were similar to Main Ditch samples in that background concentrations were exceeded for barium, manganese, and selenium. Background concentrations of arsenic and copper also were exceeded. Concentrations of these metals were less than 2 times background levels except for selenium, which was approximately seven times background. (CH2MHill 1998)

6.2.4 START-2 Visit

On September 10 and 11, 2001, the ST ART-2 visited L-Bar/Northwest Magnesite and conducted a visual inspection of the property and surrounding area (Figure 6-3; Appendix A, Photos 40-1 through 40-22 and 41-8 through 41-11; Appendix B, T eam 1 Phase 2, Pages 3 through 7, 9 and 10). T he property consisted of six buildings including primary crushing and storage, maintenance and repair shop, magnesium recovery and storage (the cooling beds area was demolished in 1994), secondary crushing and butler storage, office and laboratory, and storage bunkers. Six exterior product storage silos are sout h of t he st orage bunkers. T he buildings cont ain process equipment and flux bar residue product s in various stages of development and storage. T he complete list of materials and the building plans showing material locations can be found in the *Draft Interim Action Materials Characterization Report* produced by CES in 1996. (CH2MHill 1998)

Other significant features include three lined ponds (the evaporation, holding, and sanitary lagoon) and the covered flux bar residue pile north of the buildings. T he area around the buildings is paved with asphalt to control dust and divert surface water runoff to collection ditches for discharge to the holding pond. If the holding pond becomes full, it is equipped with an overflow that allows discharge to the Main Ditch. Stormwater contained in the holding pond is being discharged to the Colville River under an Ecology-approved stormwat er management permit (PPE 2). Underground and overhead utilit y lines are distributed throughout the site. No registered underground storage tanks are present on the property. (CH2MHill 1998)

No logging occurs in the vicinity of the plant. Farmland is located adjacent to the property.

6.2.5 Sampling Locations

Sample locations are depicted in Figure 6-4. T wo sediment samples were collected in the West Ditch. Sediment sample LBDT 03SD was collected from PPE 1 and sediment sample LBDT 02SD was collected from PPE 2.

6.2.6 Analytical Results

6.2.6.1 Sediment Sample Results

T he ST ART-2 collected one sediment sample from PPE 1 (LBDT 03SD) and one sediment sample from PPE 2 (LBDT 02SD) for T AL metals, pesticide/PCBs, and T OC analyses. No analytes were detected at elevated concentrations in these samples. Refer to T able 6-3 for data results.

6.3 NO RTHWEST ALLO YS

6.3.1 Plant Location

Latitude: 48- 21' 26.00"N

Longitude: 117- 50' 54.00"W

Legal Description: Section 14, T ownship 33N, Range 39E

CERCLIS ID: WAD094626868

County: Stevens

Contact: Ozzie Wilkinson

Northwest Alloys, Inc.
P.O. Box 115 1560 A Marble Valley Road Addy, Washington
99101-0115 (509) 935-3369

6.3.2 Historical Information

Northwest Alloys is a former magnesium plant in Addy, Washington, covering approximately 240 acres (Northwest Alloys, Inc. 1992). T he plant is located in Colville Valley which is drained by the Colville River. T he Colville Valley is bordered by rugged, mount ainous t errain. Access to the plant is restricted. In the early 1970s, Northwest Alloys, Inc., a wholly owned subsidiary of the Aluminum Company of America decided t o develop a plant for t he

production of ferrosilicon, magnesium, and silicon in Addy, Washingt on (DNR 1983). Construction began in 1973 and production began in 1976 (DNR 1983). Plant operations were discontinued in September 2001 due to economic considerations affect ing domest ic magnesium product ion.

6.3.3 Plant Description/Features

T he plant produced magnesium and ferrosilicon part ially from raw material quarried on the property. Waste products generated were either recycled, sold as product or thread, or buried on site. None of the wastes were regarded as hazardous under the Resource Conservation and Recovery Act (RCRA) but were classified as regulat ed wast es under Ecology Dangerous Waste Regulations. (E & E 1988)

T he magnesium was sold to the aluminum industry as an alloying ingredient and to the steel industry as a desulphurization agent . Ferrosilicon was used internally as a reducing agent in magnesium production. Northwest Alloys, Inc., employed the Magnetherm (Aluminathermic) process which depended upon the reaction between calcined dolomite (a mixture of calcium dioxide and magnesium oxide) and the silicon content of ferrosilicon. T he reaction took place in a liquid slag formed from the reaction of the calcium and silicon byproducts. Alumina was needed in the process to reduce the melting point of the slag and to depress unwanted secondary reactions. Aluminum was used for the same purpose and was also a supplemental reductant. (E & E 1988)

T he major raw material, dolomitic limestone, was quarried from a deposit adjacent to the plant. A second raw mat erial, pure aluminum shot , aluminum skim, or alumina, was brought in by rail. Ferrosilicon, t he t hird material used, was produced on sit e from locally mined quartzite or was brought in. (E & E 1988)

Quarried dolomite was crushed, washed, screened, and stockpiled. Because water and carbon dioxide in the dolomite will reduce magnesium product ion efficiency, it was necessary to calcine the dolomite to reduce the water and carbon dioxide to a minimum. T he calcining operation was carried out in a rotary kiln in which the dolomite traveled counter-current to hot combustion gases in the kiln. (E & E 1988)

T he calcined dolomite, plus ferrosilicon and aluminum or alumina, was fed from bins to the batch-operated magnesium reduction furnaces. T he furnaces were operated under vacuum and were totally enclosed. T he magnesium, produced as a vapor, rose from the

furnace into a condenser and was collected and solidified in crucibles. (E & E 1988)

T he used condenser-crucible assembly was taken to a cleaning area and disassembled. T he condenser and connecting pipes were cleaned and prepared for reuse. T he crucible was removed and transported to the metal service area where the magnesium was remelted, refined, cast into ingots, and shipped out by rail or truck. (E & E 1988)

In 1979, Northwest Alloys, Inc., began to fill the excavated sout h quarry with wast e products of which 10% were regulated wastes. T he regulated wastes were sandwiched between layers of low-permeability slag in the landfill. T he south landfill/quarry was estimated to be filled t o capacit y by 1990, at which time the west quarry would be utilized for waste disposal. Prior to 1980, Northwest Alloys, Inc., disposed of their regulat ed wast es on the ground at t he sout h portion of the facilit y. (E & E 1988)

T he plant was designed as a zero-discharge facility. All cooling wat er was recirculated and perimeter dikes contained and treated all surface water runoff (E & E 1988).

During the late 1970s, and into the 1980s, various non-hazardous production byproducts from the plant operations were placed into three shallow, soil-lined repositories in a portion of the site referred to as the Northwest (NW) Quadrant area. T he three repositories include the Sealed Pit, Casting Residue Mound (CRM), and North Waste Area. Some of the solid waste materials that were placed into the repositories were chloride and ammonia bearing, and/or displayed an elevated pH. Since 1995, Northwest Alloys, Inc., has conducted a series of characterization and monitoring activities within and around these repositories under the Model T oxics Cleanup Authority, Voluntary Cleanup Program, as administered by Ecology's Industrial Section. A focused hydrogeologic investigation in 1995 identified chloride and ammonia in shallow groundwater immediately adjacent to the waste repositories in the NW Quadrant area and adjacent to the wastewater storage ponds at the southern end of the plant. In 1999, Northwest Alloys. Inc., began the excavation and removal of approximately 25,000 tons of waste material as part of its ongoing volunt ary cleanup actions. T he wastes were shipped off-site to a non-hazardous subtitle D landfill in Roosevelt, Washington. In 2000, Northwest Alloys, Inc., installed a RCRA-compliant liner syst em as an engineering upgrade for a previously unlined st ormwater st orage pond. T he contents of the two wastewater storage ponds have been transferred to the lined pond. T he two wastewater ponds are now empty and available for storage of stormwater. Also in 2000, removal actions at the Sealed Pit were completed with soil removal conducted along Marble Valley Road. (Northwest Alloys, Inc. 2001)

In 2001, excavation and removal of material from the CRM was conducted and characterization sampling of the North Waste Area was performed (Northwest Alloys, Inc. 2001).

Removal of waste materials from the North Waste Area is ongoing. Other activities planned for 2002 include additional soil removal at the CRM and backfilling of the CRM and Sealed Pit areas. Closure of the RCRA Part B Landfill located on the property is also underway. (Wilkinson 2002)

Terrain is flat in the southern half of the site and hilly in the northern half. Mining and filling operations have changed the topography of the site over its operational history. Artificial fill covers much of the NW Quadrant. Native grade is observed along the western margins of the plant, along Marble Valley Road. Presently, ground elevations in the NW Quadrant of the plant site range from about 1650 to 1665 feet above mean sea level (msl). (CH2MHill 2001b)

Groundwater contamination by inorganic compounds has been documented below an on-site quarry used for disposal of wastes. The contamination appears limited in extent and no present-day migration of contaminants to drinking water aquifers appears likely. (E & E 1988) Analytical results of routine monitoring conducted at the City of Addy municipal water supply wells is provided in Appendix I.

Two surface water features, the Colville River and Stensgar Creek, are present within the immediate vicinity of the Northwest Alloys' Addy plant. The Colville River is located about 500 feet
east of the plant site and Stensgar Creek is located about 1,000 feet south of the plant. Surface water runoff from the NW Quadrant area generally is to the west and south. (CH2MHill 2001b)

6.3.4 START-2 Visit

On September 10, 2001, the START-2 visited Northwest Alloys and conducted a visual inspection of the property and surrounding area (Figure 6-5; Appendix A, Photos 40-23 through 41-7; Appendix B, Team 1 Phase 2, Pages 7 through 9). The current facility layout and surrounding areas are shown in Figure 6-5. The plant is contained within gates and hillsides. There is no overland flow from the site directly into the Colville River due to topography and surface water runoff controls. A potential overland flow exists via a series of road side ditches on the southern portion of the plant. The overland flow potentially flows through these ditches to a

ditch leading from the road on the south end of the property south towards Stensgar Creek (PPE 1). Stensgar Creek, located south of the plant, contains brown trout. Stensgar Creek Feeds into the Colville River. T he terrain is flat in the southern portion of the property and hilly in the northern portion.

6.3.5 Sampling Locations

Sample locations are depicted in Figure 6-6. NADT 01SD was collected in the ditch approximately 25 feet north of the confluence of the ditch and Stensgar Creek (PPE 1).

6.3.6 Analytical Results

6.3.6.1 Sediment Sample Results

T he ST ART -2 collected one sediment sample from PPE 1 (NAD01SD) for T AL metals analyses. Elevated concentrations of arsenic (4.9 mg/kg), copper (18.7 mg/kg), lead (7.5 mg/kg), and zinc (47.9 mg/kg) were detected in this sample. Refer to Table 6-4 for complete data results.

6.4 NAPO LEO N MINE/MILL

6.4.1 Mine/Mill Location

Latitude:	48 44' 12.10"N
Longitude:	118 06' 4.32"W
Legal Description:	NW¼ Section 3, T ownship 37N, Range 37E
CERCLIS ID:	WAN001002391
County:	Stevens
Contact:	Martha J. Kernohan, CPL Boise Cascade Corp. Mineral Resources 1111 West Jefferson St. Boise, Idaho 83728-0001 (208) 384-7529

6.4.2 Historical Information

T he Napoleon Mine/Mill is a former copper, gold, and iron mine/mill in the Northport mining district, Washington (Derkey et al. 1990). The mine is reported to have produced in 1907-1910, 1913-1917, and 1938-1955 (Derkey et al. 1990). A mill was built in 1910 to extract gold (Battien 1998). T he mine/mill was owned in 1915 by British Columbia Copper Company (Battien 1998). Historical ownership information from the time the facility began operation to the present is unknown.

6.4.3 Mine/Mill Description/Features

T he Napoleon Mine/Mill consists of two claims. T he exposed formation is part of the Mission argillite. T he ore minerals are magnetite, limonite, pyrite, and pyrrhotite. Occasional small quantities of chalcopyrite are present. T he ores were mined to a considerable extent and shipped to the smelter at Greenwood, British Columbia, where it was used as a flux. The property is developed by three main tunnels and a large glory hole. T he highest workings in the glory hole are at an elevation of 2,650 feet. T hese workings are all connected with stopes and raises. A one-mile aerial tramway was built from the mine to the bunkers at the railroad along Kettle River. (Weaver 1920)

6.4.4 START-2 Mine/Mill Visit

On September 12, 2001, the ST ART -2 visited the Napoleon Mine/Mill and conducted a visual inspection of the property and surrounding area (Figure 6-7; Appendix A, Photos 41-12 through 41-17; Appendix B, T eam 1 Phase 2, Pages 11 and 12). T he mine/mill area consisted of an adit measuring 5 feet by 4 feet located south of the dirt road entrance. T here was no evidence of tailings or waste rock present on the property. T he adit discharge flowed across the dirt road, down the hillside approximately 120 feet, before entering an intermittent creek (PPE 1). Iron staining was present on the soil and the dirt road. T here was no adit discharge at the time of the visit. Access to the mine/mill was restricted by a locked gate. No logging or livestock grazing was noted in the vicinity of the property.

6.4.5 Sampling Locations

Sample locations are depicted in Figure 6-8. One surface water sample (NPAD01SW) was collected from the adit. T he sample was collected within the

overland surface water drainage route identified by the ST ART-2. T he sample was collected to determine potential contamination associated with this source. T he sample was clear. No odor was noted during sample collection. Iron staining was present on the soil and the dirt road identifying the drainage pathway to the intermittent creek.

PPE 1 (NPPP01SD) was collected at the confluence of the adit discharge and the intermittent creek.

6.4.6 Analytical Results

6.4.6.1 Surface Water Sample Results

Analytes detected in NPAD01SW include lead (11.3 .g/L) and zinc (937 .g/L).

6.4.6.2 Sediment Sample Results

T he ST ART-2 collected one sediment sample from PPE 1 (NPPP01SD) for T AL metals, pesticide/PCBs, and T OC analyses. Copper was detected in this sample at an elevated concentration of 207 mg/kg. Refer to T able 6-5 for complete data results.

6.5 FIRST THO UGHT MINE

6.5.1 Mine Location

Latitude:	48 53' 2.04"N
Longitude:	118 09' 32"W
Legal Description:	Section 18, T ownship 39N, Range 37E
CERCLIS ID:	WAN001002374
Cont act:	Bill Campbell Western Continental, Inc. P.O. Box 14006 Spokane, Washington 99214

6.5.2 Historical Information and Mine Description/Features

T he First T hought Mine is a former gold and silver mine located in the Orient district, Washington. T he mine was located in 1896 and was an almost continuous shipper from 1904 to 1910. It is estimated that the mine produced slightly over 40,000 tons of ore. T he chief values of the ore were in gold. T he property is developed by three tunnels driven into the mineralized zone, a shaft, and drifts. T he mineralized

portion contains finely disseminated crystals of pyrite which carry the gold values. (Weaver 1920)

6.5.3 START-2 Mine Visit

On September 12, 2001, the ST ART-2 visited the First T hought Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 1 Phase 2, Pages 12 through 14). T he area consisted of waste rock piles, a dilapidated house, and a possible shaft with an opening measuring approximately 5 feet in diameter (Appendix A, Photos 41-18, 41-20, 41-21). T he shaft and dilapidated house were located on the east side of the property. Waste rock piles were located approximately 200 feet west of the shaft. A road and cow pasture were located on the south side of the property. A creek flows through the pasture. T he ST ART -2 observed boxes containing samples of soil borings. Some of the boxes were marked either Shell, F.T ., PF, BC, or Boise Cascade (Appendix A, Photo 41-19). T he ST ART-2 did not observe any overland drainage routes from the waste rock piles to surface water. Access to the mine was unrestricted. No residents or potential receptors were observed on the property. No samples were collected at the First T hought Mine.

6.6 LO TTIE MINE

6.6.1 Mine Location

Latitude:	48- 51' 53.28"N
Longitude:	118- 01' 15.24"W
Legal Description:	Section 19, T ownship 39N, Range 38E
CERCLIS ID:	WAN001002384
County:	Stevens
Contact:	United States Department of the Interior Bureau of Land Management Spokane District Office 1103 N. Fancher Spokane, Washington 99212-1275 (509) 536-1200

6.6.2 Historical Information and Mine Description/Features

T he Lottie Mine is a former copper, gold, and silver mine located in the Fifteen Mile Creek district, Washington. T he mine was located in 1898 and was developed by a 50-foot shaft, open cut work, and trenching for a distance of over 500 feet along the course of the vein. T he ore minerals are chalcopyrite, pyrite, and pyrrhotite which are said to assay in copper, gold, and silver. About 50 tons of ore are said to have been mined. (Weaver 1920)

6.6.3 START-2 Mine Visit

On June 18, 2001, the ST ART-2 visited the Lottie Mine and conducted a visual inspection of the property and surrounding area (Appendix B, Team 2 Phase 1, Pages 2 and 13). T he ST ART -2 observed two log structures and a waste rock pile near these structures (Appendix A, Photos 21-6, 21-7 and 21-8). T he waste rock pile was mixed with soil and measured approximately 30 feet by 15 feet by 3 feet deep (Appendix A, Photo 21-5).

An upper road was located approximately 500 feet northwest from the log structures. The upper area consisted of two waste rock piles. One waste rock pile measured an estimated 60 feet by 30 feet by 10 feet deep (Appendix A, Photo 29-18). The other waste rock pile measured approximately 15 feet by 15 feet by 4 feet deep. The START -2 did not observe any overland drainage routes from the waste rock piles to surface water. Access to the mine was unrestricted. No residents or potential receptors were observed on the property. No samples were collected at the Lottie Mine.

6.7 HO MESTAKE NO . 1 MINE

6.7. Mine Location 1

Latitude:	48 52' 06.96"N
Longitude:	118 01' 18.84"W
Legal Description:	Section 19, Township 39N, Range 38E
CERCLIS ID:	WAN001002378
County:	Stevens
Contact:	United States Department of the Interior Bureau of Land Management Spokane District Office 1103 N. Fancher Spokane, Washington 99212-1275 (509) 536-1200

6.7.2 Historical Information and Mine Description/Features

T he Homestake No. 1 Mine is a former copper, gold, silver and mine situated in the Northport district, Washington. The mine is part of the Electric Point property. (Huntting 1956)

6.7.3 START-2 Mine Visit

On June 24, 2001, the ST ART -2 visited the Homestake No. 1 Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 2 Phase 1, Page 13). T he area consisted of shafts and two waste rock piles (Appendix A, Photos 29-5 through 29-15). One waste rock pile measured an estimated 300 to 400 cubic yards. T he ST ART-2 did not observe any overland drainage routes from the waste rock piles or shafts to surface water. Access to the mine was unrestricted. No residents or potential receptors were observed on the property. No samples were collected at the Homestake No. 1 Mine.

6.8 ANTELO PE MINE

6.8.1 Mine Location

Latitude:	48 52' 04.80"N
Longitude:	118 01' 05.88"W
Legal Description:	Sections 19-20, T ownship 39N, Range 38E
CERCLIS ID:	WAN001002368
County:	Stevens
Contact:	William Inglis 551 Austin Street, Suite 1103 Coquitlam, British Columbia V3K6R7 Canada

6.8.2 Historical Information and Mine Description/Features

T he Antelope Mine is a former copper and gold mine located in the Orient district, Washington. T he mine claim, located in 1898, is reported to have produced 50 tons of ore (Huntting 1956). Bedrock outcrops are largely covered with deposits of glacial drift, but where exposed are a part of the Jumbo volcanic formation. A vein, averaging in width from two and one-half to four feet, consists of chalcopyrite, pyrite.

and pyrrhotite. Small quantities of melanterite are present in vein pockets. (Weaver 1920)

6.8.3 START-2 Mine Visit

On June 24, 2001, the ST ART -2 visited the Antelope Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 2 Phase 1, Page 13). T he mine was accessed by a Forest Service road and is situated approximately 50 feet from the end of the road. T he area consisted of a shaft and a waste rock pile (Appendix A, Photos 29-3 and 29-4). T he shaft opening measured 15 feet by 10 feet and the waste rock pile measured approximately 40 feet long by 40 feet wide by 2 feet deep. T he ST ART -2 did not observe any overland drainage routes from the shaft or waste rock pile to surface water. No residents or potential receptors were observed on the property. No samples were collected at the Antelope Mine.

6.9 HUBBARD MINE

6.9.1 Mine Location

Latitude:	48 55' 15.96"N
Longitude:	117 52' 03.72"W
Legal Description:	E½ Section 32, T ownship 40N, Range 39E
CERCLIS ID:	WAN001002380
County:	Stevens
Contact:	Colville National Forest 765 South Main Colville, Washington 99114

6.9.2 Historical Information and Mine Description/Features

T he Hubbard Mine is a former copper, gold, lead, silver, and zinc mine situated at the head of Squaw Creek, Washington. T he mine was reported to be owned by Bruder Mining Company, Hubbard Mining Corporation (1945), and Mines Management, Inc. (1949). Historical ownership information from the time the facility began operations to the present is unknown. T he ore deposit consists of sulfides concentrated in small bunches in a quartz vein from 10 to 12 feet wide in phyllite. (Huntting 1956)

6.9.3 START-2 Mine Visit

On June 24, 2001, the ST ART -2 visited the Hubbard Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 2 Phase 1, Page 14). A waste rock pile, three shafts, a log structure, and former housing were observed on the property (Appendix A, Photos 29-23, 29-24, and 30-1 through 30-5). T he waste rock pile measured approximately 40 feet by 40 feet by 20 feet deep. T he ST ART -2 did not observe any overland drainage routes from the waste rock pile to surface water. Access to the mine was unrestricted. No residents or potential receptors were observed on the property. No samples were collected at t he Hubbard Mine.

6.10 NEW LEADVILLE MINE

6.10.1 Mine Location

Latitude:	48- 44' 08.52"N
Longitude:	117- 52' 33.60"W
Legal Description:	SE¼ Section 3, T ownship 37N, Range 39E
CERCLIS ID:	WAN001002392
County:	Stevens
Contact:	United States Department of the Interior Bureau of Land Management Spokane District Office 1103 N. Fancher Spokane, Washington 99212-1275 (509) 536-1200

6.10.2 Historical Information and Mine Description/Features

T he New Leadville Mine is a former lead mine located in the Bossburg mining district, Washington. An alternate name is the Yo T ambien Mine. T he mine produced prior to 1924 (Huntting 1956). T he ore body is irregular in shape and has been stoped to a considerable extent near the surface (Jenkins 1924). Historical ownership information from the time of patent to the present is unknown.

6.10.3 START-2 Mine Visit

On June 20, 2001, the ST ART -2 visited the New Leadville Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 3 Phase 1, Pages 11 and 12). T he mine area consisted of two adits, a waste rock pile, building debris, a collapsing building, and remnants of rail lines (Appendix A, Photos 10-17 through 10-22). Adit 1 appeared to flow into adit 2. Adit 1 was located approximately 39 feet southwest from the collapsing building. Adit 2 was located approximately 23 feet south and 20 feet west from adit 1. T he drainage route from adit 2 was dry. A pH reading of 6 was measured at the discharge from adit 1. T he waste rock pile, located approximately 53 feet from adit 1, measured an estimated 25 feet long by 40 feet wide by 5 feet deep. Remnants of rail lines were observed above adits 1 and 2. T he ST ART -2 did not observe any overland drainage routes from the adits or waste rock pile to surface water. Access to the mine was unrestricted. No residents or potential receptors were observed on the property. No samples were collected at the New Leadville Mine.

6.1 R.J. MINE
1

6.11.1 Mine Location

Latitude:	48 43' 54.84"N
Longitude:	117 52' 31.80"W
Legal Description:	Section 3, T ownship 37N, Range 39E
CERCLIS ID:	WAN001002395
County:	Stevens

6.11.2 Historical Information and Mine Description/Features

T he R.J. Mine is a former lead and silver mine located in the Northport mining district, Washington (Weaver 1920). T he mine was located in 1900 (Battien 1998). Mine formation is a bluish-white limestone forming a high bluff on the east side of Clugston Creek. Veins in the form of replacement deposits occur in fracture zones and contain galena with silver. T he property has been developed by several open cuts, shallow shafts, and short tunnels (Weaver 1920). Historical ownership information from the time of patent to the present is unknown.

6.11.3 START-2 Mine Visit

On June 20, 2001, the ST ART -2 visited the R.J. Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 3 Phase 1, Page 13). T he ST ART-2 observed a waste rock pile and a flowing adit (Appendix A, Photos 11-1

and 11-4). Adit flow was estimated to be 2 to 5 cubic feet per second (cfs) and was drained by a 10-inch diameter polyvinyl chloride pipe extending approximately 50 feet and ending abruptly (Appendix A, Photo 11-1 and 11-3). Discharge continued to flow an estimated 150 feet before infiltrating the ground. Inside the adit a spray painted sign read "ORMC 154465 Eureka Surprise" (Appendix A, Photo 11-2). T he distance of the adit from the waste rock pile is approximately 88 feet. T he waste rock pile measured approximately 46 feet tall by 90 feet wide by 20 feet deep. T he area at the base of the waste rock pile was dry and vegetation was growing on the pile. T he ST ART-2 did not observe any overland drainage routes from the adit or waste rock pile to surface water. Access to the mine was unrestricted. No residents or potential receptors were observed on the property. No samples were collected at the R.J. Mine.

6.12 VAN STO NE MINE/MILL

6.12.1 Mine/Mill Location

Latitude:	48 45' 38.16"N
Longitude:	117 45' 23.76"W
Legal Description:	E½ Section 33, Township 38N, Range 40E
CERCLIS ID:	WAD980834808
County:	Stevens
Contact:	Equinox Resources (Washington) Inc. c/o Mano River Resources Inc. Suite 600 890 West Pender Street Vancouver, British Columbia V6C 1K4 Canada (604) 689-1700 fax (604) 687-1327

6.12.2 Historical Information

T he Van Stone Mine/Mill is a former cadmium, lead, and zinc mine/mill located on the upper portion of Onion Creek near Northport, Washington (Derkey et al. 1990). T he mine is reported to have produced in 1930, 1937, 1942, and 1952-1956 (Derkey et al. 1990). Production to the end of 1956 was 2,242,960 tons of ore milled, yielding 10,700 tons of lead concentrates and 120,000 tons of zinc concentrates (Mills 1977).

George Van Stone claimed and worked the mine/mill until 1926 (Battien 1998). Hecla Mining Company acquired the property in 1926, and Van Stone Mining Company took over in 1930 (Battien 1998). Willow Creek Mines of Nevada operated the mine/mill

from 1938 to 1942 (Mills 1977). In 1950, American Smelting and Refining of Salt Lake City bought the claims and the surrounding land (Battien 1998). T he property was operated intermittently by Asarco, Inc., during the 1950s and 1960s (Beacon 1999). In 1972, Callahan Mining Corporation acquired the mill and mine property (Mills 1977). Equinox Resources, Inc., acquired the property in 1990 and placed it back into production in 1991 (Beacon 1999). T he operations were suspended in late 1992 due to low metal prices and have been under care and maintenance since January 1993 (Beacon 1999). Equinox Resources, Inc., filed a preliminary Reclamation and Closure Plan with the Washington State Department of Natural Resources (DNR) prior to the reopening of the mine/mill in 1991. Under current legislation, Equinox Resources Inc., is required to file a revised Reclamation and Closure Plan (Beacon 1999). The Reclamation and Closure Plan present two possible outcomes; closure of existing operations without additional mining, and closure following the mining and processing of additional known ore reserves (Beacon 1999). T he objective of the Reclamation and Closure Plan is to provide a systematic approach to decommissioning the Van Stone Mine/Mill and ret urning all dist urbed lands associated with t he mine/mill operations (post-1971) to a mixed land use capability. T he mixed land use classification is defined as consisting of a combination of forest lands, open space lands, shrub and grasslands, wetlands, wildlife habitat, talus slopes, and agricultural lands (Beacon 1999).

6.12.3 Mine/Mill Description/Features

T he Van Stone Mine/Mill is on the east side of the Columbia River and southwest of Northport, Washington. Geologic setting includes deposition of heavy minerals in river gravels. Production was from two open pits a few hundred feet south of the south margin of the Spirit pluton. T he ore deposit is within the middle dolomite unit of the Metaline Limestone, approximately 200 feet from the overlying upper limestone unit at its closest point. (Mills 1977)

Rock was removed from the mine, crushed on site, and the usable material trucked off site for furt her processing. Fine-grained tailings were carried in a slurry via an elevated wooden flume first t o the old tailings pile, and later to a large t ailings pile locat ed in Sect ions 29 and 30. T he slurry was dumped into the pile to allow t he sediment to set tle out of the slurry. T he new tailings pile walls were built up from dried t ailings and at present stand 10 t o 50 feet above the ground surface. T he

wooden slurry line was replaced in the 1990s with a durable, flexible pipe. (Boise Cascade Corporation 1997)

The Van Stone Mine/Mill operations were located in the Onion Creek watershed approximately 21 miles northeast of Colville, Washington. Onion Creek has been categorized by Ecology as a Class AA (extraordinary) surface water body. A comprehensive analyses of the entire Onion Creek watershed titled *Onion Creek Watershed Analysis* was carried out in March 1997 for Boise Cascade Corporation by a number of organizations, including DNR, Ecology, Stevens County Conservation District, Vaagen Brothers Lumber, Arden Tree Farm, Inland Empire Paper, Maurice Williamson, and the Washington Farm Forestry. The purpose of the assessment was twofold: to provide an understanding of the current and possible future states of channel conditions, and to locate accessible fish habitat in the watershed to identify existing conditions and habitats of special concern. The assessment identified localized evidence of land use impacts to fish-bearing channels including a disturbance described as "major" in the tributary adjacent to the Van Stone Mine due to an apparent tailings pipe-burst or associated slope failure which occurred prior to 1968. (Raines, et. al. 1997)

6.12.4 START-2 Mine/Mill Visit

On June 22 and 23, 2001 the START-2 visited Van Stone Mine/Mill and conducted a visual inspection of the property and surrounding area (Figures 6-9 through 6-11; Appendix A, Photos 1-1 through 9-25; Appendix B, Team 1 Phase 1, Pages 24 and 25; Team 2 Phase 1, Pages 10 through 12; Team 3 Phase 1, Pages 20 through 22). The mine/mill area consisted of a waste rock storage area, two tailings piles, an open pit, a seepage pond, buildings, and stained soil areas.

The waste rock storage area was constructed by end dumping to the south contour from the open pit haul road. The eastern toe of the waste rock storage area consists mostly of larges and is located less than 100 feet of the Northeast Fork of Onion Creek. Slopes on the north side of the haul road consist, in part, of colluvial overburden. Depth and quantity of overburden has yet to be determined. (Beacon 1999)

The tailings embankments consist of steep sided erodable tailings sands. In some locations the slopes are heavily rilled, particulary along the south and west faces. (Beacon

1999)

A rock-lined spillway and discharge channel has been installed in the extreme northeast corner of the main tailings impoundment to direct any excess accumulated rainwater to the adjacent drainage. T ailings area water quality is monitored every 90 days and is reported to be suitable for discharge under the facility's Washington State Water Discharge Permit or can be used for irrigation purposes.

A seepage pond is located adjacent to the tailings facility.

T he open pit, located in the most southern portion of the area, is oblong in shape with an average width of 120 feet, an average length of 317 feet, and a maximum depth of 460 feet. T he pit is flooded to an elevation of 3,510 feet or 170 feet above the current pit bottom. T he rim of the open pit and portions of the top bench currently support vegetation. T he water in the open pit is separated from a tributary to the Northeast Fork of Onion Creek by a narrow rock-filled berm. T he water level in the open pit is static at 3,510 feet elevation and excess water seeps through the berm to the adjacent creek (PPE 3). (Beacon 1999)

T he buildings on site include the process plant, crushing plant, mill building, mill shop, warehouse, change house, assay office, garage, scale house, core storage, switch building, pit shop, conveyor system, reagent and fuel storage areas, bunk house, and four residences. Other miscellaneous items include a 20 million gallon water tank, return water tank, power feeders, pump power line, T-6 tractor, car spotter, tailings pipe line, tailings flume, tailings dam, 60 million gallon water tank, 200 million gallon water tank, fire mains and hydrants, domestic water main, two pipe lines, three dams and pipe lines, pit power lines and switchgear, pit water line, pit air line, mine shop equipment, and road equipment. (Beacon 1999)

Six areas of stained soil were noted on the property. T he first area was near a liquid propane tank sout h of the mill building. T he second area was near elevated t ransformers adjacent to the mill building. At this location the soil was stained orange and green. T he third area was near an aboveground st orage t ank (AST) wit h secondary containment near the entrance to the mine/mill. T he cont ainment area was filled wit h water and smelled of diesel. No sheen was noted. T he secondary containment had been breached. T he fourth area was on a concrete pad with staged transformers and stained soil south of the liquid propane tank. T he fifth area was near staged 55-gallon drums surrounded by stained soil west of the mine/mill buildings and south of t he Roundup Powder Company abandoned building. T he sixth area was near another AST area surrounded by stained soil located east of the shed and staged 55-gallon drums.

Several unnamed creeks were located adjacent to the property. One unnamed creek was located south of the mine pit water and could not be accessed due to safety concerns. A second unnamed creek was located at the southwest port ion of t he old tailings pile. Surface water runoff from this pile drains to this creek (PPE 4). A third unnamed creek was located on Boise Cascade Corp. property; no sample was collected due to lack of access. A fourth unnamed creek was located adjacent to the tailings pile near t he entrance to the mine/mill. Surface water runoff from the tailings pile also drains t o this creek at two locations (PPE 1 and PPE 2). Excess water from the on-site open pit seeps through the pit berm to an adjacent creek (PPE 3).

A number of public, private, and commercial interests access the mine/mill access road. Boise Cascade Forest District maintains an easement over the road to access their timber holdings. Washington Water Power maintains an easement over the road to access a substation located on the mine/mill property. T here are residences near the road junction and the DNR uses the road for fire control. (Beacon 1999)

Access t o the mine/mill is restricted by t wo locked gates. No logging or grazing was noted in the vicinity of the property.

6.12.5 Sampling Locations

Sample locations are depicted in Figures 6-12 through 6-14. T welve waste rock samples (VSWP01SS through VSWP12SS) were collected from the waste rock pile. T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were

collected to determine potential contamination associated with this source. T he samples appeared to consist of tan/gray, fine sand with gravel and rocks. No odor or staining was noted during sample collection.

T wenty-one tailings samples (VST P01SS through VST P21SS) were collected from two tailings piles. T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to consist of dark gray/brown, fine, dry sand and t ailings. No odor or staining was noted during sample collection. Samples VST P01SS through VST P09SS and VST P21SS were collected from the tailings pile located near t he

entrance to the mine/mill. Samples VST P10SS through VST P20SS were collect ed from the old t ailings pile located on t he eastern portion of t he mine/mill.

Seven surface soil samples (VSSS01SS t hrough VSSS07SS) were collect ed from st ained soil areas around the mine/mill propert y. T he samples were collected from stained areas ident ified by the ST ART-2. T he samples were collected to determine potential contamination associated with these sources. Odor and staining was noted during sample collection.

One co-located surface water and sediment sample (VSMW01SW and VSMW01SD) was collected from the mine pit water. T he sample was collected within the overland surface water drainage route identified by the ST ART-2. T he sample was collected to determine potential contamination associated with this source. T he surface water sample was clear and blue-green in color. No odor or staining was noted during the surface water sample collection. T he sediment sample appeared to consist of silty sand to fine gravel, gray to light brown in color, with a slight odor. No staining was noted during sediment sample collection.

One sediment sample (VSPP01SD) was collected at PPE 1 from the confluence of t he t ailings pile and the pond located near the entrance of the mine/mill. One sediment sample (VSPP02SD) was collected at PPE 2 from the potential overland flow from the tailings pile to t he unnamed creek located near the entrance of the mine/mill. One sediment sample (VSPP03SD) was collected at PPE 3 from the northwest corner of the mine pit water area. One sediment sample (VSPP04SD) was collected from PPE 4 near the southwest portion of the old tailings pile at the confluence with an unnamed creek.

6.12.6 Analytical Results

6.12.6.1 Surface Soil Sample Results

T he ST ART -2 collected a total of 38 surface soil samples for T AL metals analyses: twelve waste rock samples (VSWP01SS through VSWP12SS); twenty-one tailings samples (VST P01SS through VST P21SS); and seven surface soil samples (VSSS01SS through VSSS07SS) from areas of st ained soil. Seven surface soil samples also were analyzed for pesticide/PCBs and SVOCs.

In waste rock samples, significant concentrations of cadmium ranged from 27.9 mg/kg to 234 mg/kg. Significant concentrations of lead ranged from 1,520 mg/kg to 76,500 mg/kg.

Significant concentrations of mercury ranged from 0.26 mg/kg to 1.5 mg/kg. Significant concentrations of zinc ranged from 3,450 mg/kg to 20,600 mg/kg.

In tailings samples, a significant concentration of lead was detected at 4,710 mg/kg. A significant concentration of mercury was detected at 0.17 mg/kg. Significant concentrations of zinc ranged from 2,610 mg/kg to 5,870 mg/kg.

In samples collected from stained soil areas, significant concentrations of cadmium ranged from

24.7 mg/kg to 940mg/kg. Significant concentrations of copper ranged from 218 mg/kg to 461 mg/kg. Significant concentrations of lead ranged from 771 mg/kg to 181,000 mg/kg. Significant concentrations of mercury ranged from 0.15 mg/kg to 6.0 mg/kg. Significant concentrations of zinc ranged from 3,560 mg/kg to 431,000 mg/kg. Refer to Table 6-6 for complete data results.

6.12.6.2 Surface Water Sample Results

Analytes of concern that were in the surface water sample collected from the mine pit water (VSMW01SW) consist of zinc at an estimated concentration of 112 .g/L.

6.12.6.3 Sediment Sample Results

The START-2 collected five sediment samples for TAL metals analyses. Three sediment samples were also analyzed for pesticide/PCBs. No analytes were detected at significant concentrations in the sample from the mine pit. Lead was detected at an elevated concentration of 466 mg/kg and zinc was detected at an elevated concentration of 1,960 mg/kg in VSPP01SD (PPE 1). Cadmium was detected at an elevated concentration of 11.9 mg/kg and zinc was detected at an elevated concentration of 3,670 mg/kg in VSPP03SD (PPE 3). No analytes were detected at elevated concentrations in sediment samples VSPP02SD (PPE 3) or VSPP04SD (PPE 4). Refer to Table 6-7 for complete data results.

6.13 HOPE AND TWIN CABINS MINE

6.13.1 Mine Location

Latitude:	48- 53' 09.96"N
Longitude:	118- 01' 37.92"W
Legal Description:	Sections 7 and 18, Township 39N, Range 38E
CERCLIS ID:	WAN001002379
County:	Stevens

Contact: United States Department of the Interior
Bureau of Land Management
Spokane District Office
1103 N. Fancher
Spokane, Washington 99212-1275
(509) 536-1200

6.13.2 Historical Information and Mine Description/Features

T he Hope and T win Cabins Mine is a former copper, gold, and silver mine located in the Fifteen Mile Creek district, Washington. An estimated 100 tons of ore were produced. T he ore deposit consists of pyrrhotite containing some chalcopyrite in a mineralized zone about seven feet wide and lying in the acidic dioritic dike rock. T he claim is developed by two tunnels, each about 30 feet in length. In addition, there are several open cuts and shallow shafts (Weaver 1920). Historic ownership information from the time of patent to the present is unknown.

6.13.3 START-2 Mine Visit

On June 24, 2001, the ST ART -2 visited the Hope and T win Cabins Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 2 Phase 1, Page 13). T he area consisted of a shaft and a waste rock pile. T he shaft measured approximately 15 feet by 15 feet by 30 feet to water. T he waste rock pile measured an estimated 20 feet by 35 feet by 4 feet deep (Appendix A, Photos 29-21 and 29-22). T he ST ART-2 did not observe any overland drainage routes from the waste rock pile to surface water. Access to the mine was unrestricted. No residents or potential receptors were observed on the property. No samples were collected at the Hope and T win Cabins Mine.

6.1 ST. CRISPIN MINE
4

6.14.1 Mine Location

Latitude:	48 56' 30.99"N
Longitude:	117 47' 07.47"W
Legal Description:	Section 25, T ownship 40N, Range 39E
CERCLIS ID:	WAN001002398
County:	Stevens

6.14.2 Historical Information and Mine Description/Features

T he St. Crispin Mine is a former copper, gold, lead, and silver mine situated on Sheep Creek, approximately one mile west of Northport, Washington. T he formation

exposed in the bed of Sheep Creek is a dark, carbonaceous argillite. A shaft was sunk in the creek to a depth of 16 feet on a mineralized zone in the argillite. Eight other similar mineralized zones are reported to occur to the southwest. Back from the creek a second shallow shaft was sunk and from it several drifts were driven (Weaver 1920). Historical ownership information from the time of patent to the present is unknown.

6.14.3 START-2 Mine Visit

On September 13, 2001, the ST ART-2 attempted to locate the St. Crispin Mine. T he ST ART -2 followed an access road along Sheep Creek to a campground area at the end of the road. T he ST ART-2 continued on foot for approximately a quarter mile along Sheep Creek. No shafts were identified; however, they could have been submersed under water. T he ST ART-2 returned to the campground area to collect latitudinal and longitudinal coordinates. No samples were collected at the St. Crispin Mine because the mine was not located.

6.15 NO RTHPORT MILL

6.15.1 Mill Location

Latitude: 48- 56' 31.08"N

Longitude: 117- 45' 15.66"W

Legal Description: NE¼ NW¼ Section 29, T ownship 40N, Range 40E

CERCLIS ID: WAN001002393

County: Stevens

Contact: Dan Dumaine, General Manager
Mountain Minerals Northwest Company, Ltd.
(a division of Highwood Resources Ltd.)
3403 - 6th Avenue South
Lethbridge, Alberta
Canada T 1J 1GC

6.15.2 Historical Information and Mill Description/Features

T he Northport Mill is a former rock ore mill situated adjacent to Washington State Highway 25, in Northport, Washington. T he property was listed under Kendrick Mercantile Company (1925), Mines Management, Inc. (1951), Idaho Continental Mines, Inc. (1964), Silver

Crown Mining Company, Inc. (1970), T ri H Mining Company, Inc. (1979), Crown-S, Inc. (1981), Northport Mill (1985), Matovich Mining Industries, Ltd. (1990), and Mountain Minerals Northwest Company, Ltd. (1992). Mountain Minerals Northwest Company, Ltd., is a division of Highwood Resources Ltd., the current property owner. T he property occupies approximately 16 acres. (Pepper 2001)

Highwood Resources, Ltd., operated a rock ore mill at the site from the late 1980s to early 1990s. T he plant feed was impure barite rock mined in the vicinity. T he ore was processed for barium sulfate. T he rock ore was crushed then ground, with barite separated using floatation processes. Various chemicals and reagents were added to cause the barite to float and the calcium carbonate and silica to settle during floatation. T he material that did not float was pumped to a tailings pond by overhead piping. T he tailings pond is lined with a high-density polyethelene (HDPE) 80 millimeters (Pepper 2001). T he lined tailings pond has a waste water re-circulation system of approximately 10,000 cubic feet of volume (Ecology 1990). T he dried product was pneumatically conveyed (blown by dry air) through an underground pipeline to the product storage silo (Pepper 2001).

In August 2002, Highwood Resources, Ltd., the current property owner, conducted the disposal of laboratory chemicals and drummed waste/tailings present on the property. Disposal activities were conducted by Spencer Environmental, Portland, Oregon. An inventory of chemicals and wastes/tailings that were removed from the site was provided to the EPA. As of September 2002, twenty drums of mill reagents remain on site. All twenty drums have been overpacked. T he property owner is exploring opportunities for use of the reagents elsewhere and continues to address the environmental issues with this site under the direction of Ecology. (Dumaine 2002).

6.15.3 EPA Visit

On November 28, 2001, EPA personnel visited the Northport Mill site and conducted a visual inspection of the property and surrounding area (Figure 6-15; Appendix B, EPA Logbook, Pages 1 through 5). T he property is fenced and access is restricted by a locked gate. Representatives of Highwood Resources Ltd. (Dan Dumaine and T erri Pepper) and representatives of the Colville Confederated T ribes (Patti Stone and Don Hurst) were present during the visit. T he area consisted of two AST s, a product storage silo, a conveyor plant, a tailings pond, an ore rock pile, a process building with chemical feeders and floatation cells, a mill building with an adjoining thickener room, a dryer, an assay laboratory, an office and a

"portable-type" building used for sample preparation (Appendix A, Photos 47-1 through 47-21). T he capacity of each of the AST s was estimated at 8,000 to 10,000 gallons (Appendix A, Photo 47-4). T he property representatives were not knowledgeable of what the tanks were used for and believed they were empty. T hree barrels observed on the property contained soil-like material (Appendix A, Photo 47-6). According to Dan Dumaine, he sampled the barrels in the summer of 2001. At the time of the visit, he had not received the sample results. A tailings pond was also observed on the property. Access to the tailings pond is restricted by a fence (Appendix A, Photo 47-11). According to T erri Pepper, the pond is lined with an HDPE liner. T he volume of solid material observed at the bottom of the tailings pond was estimated to be 150 feet by 80 feet by 2 feet deep. Mr. Dumaine mentioned that he also collected samples from the tailings pond in the summer of 2001. At the time of the visit, he had not received the sample results. Inside the building that housed the thickener room, numerous drums and containers were observed. Some labels indicated contents including fatty acids, promoters, frothers, caustic soda, potassium chloride, ammonia acetate, and floatation agents (Appendix A, Photo 47-16). Inside the assay laboratory, numerous sample jars and containers were observed with labels indicating oxidizers, hydrochloric acid, amberine, reagents, and others (Appendix A, Photos 47-19 and 47-20). Sheep Creek is located approximately 150 feet from the mill. No overland drainage routes from the tailings pond to Sheep Creek were observed. No residents or potential receptors were observed on the property. No samples were collected at the Northport Mill.

During the visit, Mr. Pepper and Mr. Dumaine briefly discussed plans by the property owner to reclaim the site. Some of the planned activities include the proper abandonment of the tailings pond, dismantling and removing some of the equipment found throughout the property, and the proper removal/disposition of chemical substances on the property.

6.16 LERO I/NO RTHPO RT SMELTER

6.16.1 Smelter Location

Latitude:	48 55' 23.16"N
Longitude:	117 46' 02.28"W
Legal Description:	Section 33, T ownship 40N, Range 40E
CERCLIS ID:	WAD988507323
County:	Stevens

Smelter Owner/Contact: Murray McConnachie
K.E.S.

Contractin
g Ltd.
1252 Bay
Avenue T
rail, British
Columbia
Canada
V1R 4A6
(250) 368-
5222

6.16.2 Historical Information

T he LeRoi/Northport Smelter is a former smelter located northeast of the town center of Northport, Washington, along Highway 25. T he city of Northport is located along the east bank of the Columbia River approximately 7 miles south of the U.S.-Canada border in Stevens County. (URS 1993)

T he Northport-Waneta Road borders the LeRoi/Northport Smelter site along the south and east. Highway 25 defines the western boundary of the site. T he Burlington Northern Sante Fe Railway (formerly the Spokane Falls and Northern Railroad) runs parallel to the Columbia River and designates the northern site boundary. T he Columbia River is located approximately 200 feet north of the LeRoi/Northport Smelter property. Properties west of the site are residential homes. Smelter Hill is located directly east of the site and Silver Crown Mountain is south of the site. A city park with an area of approximately 10 acres is located northwest of the site along the Columbia River, approximately 50 feet from the site. (URS 1993)

T he property encompasses approximately 32 acres and is accessed from the Northport-Waneta Road via Highway 25 (SAIC 1997). T he ground surface generally slopes toward the Columbia River in elevation from about 1,360 feet above msl at the site to 1,290 feet above msl; the normal pool elevation for the Columbia River (SAIC 1997). T he former smelter buildings, which are no longer standing, included the furnace building, the roaster building, and the crusher and ore building (Heritage 1981).

Beginning in 1897, the smelter refined copper, lead, and silver ores from mines in northeast Washington, as well as copper ore from British Columbia, Canada (DHHS 1999). In 1901, the LeRoi Company smelting operations reorganized as the Northport Smelting and Refining Company

(URS 1993). By 1908, it was one of the largest smelters on the West Coast, processing 500 tons of ore per day (URS 1993). In 1909, the smelter closed because of competition from another smelter located in T rail, British Columbia (URS 1993). During World War I, the government demand for lead encouraged the Northport Mining and Smelting Company to reopen and process the lead ores that had been discovered at Leadpoint, Washington, approximately 9 miles east of Northport (URS 1993). In September 1914, Jerome Day purchased the smelter and renovated it to accommodate lead ores (URS 1993). T he government curtailed its lead purchases in 1921, and subsequently, the smelter closed and was dismantled in 1922, after 24 years of sporadic operation (DHHS 1999). After the smelter closed, the American Smelting and Refining Company purchased the site. T he company removed the smelting equipment and transported it to a smelter elsewhere (URS 1993). Between 1922 and 1953, the inactive site was purchased by J.D. Harms. Between 1953 and 1969, a lumber mill went into operation on the property (URS 1993). In 1975, Cecil Frazier purchased the property and operated the lumber mill (URS 1993). In 1985, Steve Frazier purchased the property and business and operated the mill under the name SSF Building Materials until the property was sold to the current owner in 2001.

6.16.3 Smelter Description/Features

Refer to Appendix F for historical site maps. T he smelter, Breen Copper Smelter, operated from 1896 until 1901. T he initial smelter operations were rudimentary and involved releases of large quantities of pollutants. T he tellurium ore was more difficult to process: however, it contained high enough amounts of copper and gold to make the process worthwhile. T ellurium is naturally occurring and belongs to the same family of elements as selenium and sulfur. Because of the tellurium, the ore had to be burned or heated to release the minerals. T he burning released high amounts of sulfur dioxide into the air. (URS 1993)

T he ore was processed by heap roasting, which involves open burning of the raw ore prior to placing it in a mineral filtration furnace. T he heap roasting process produced a disagreeable sulfur odor; the local citizens termed the burning piles "stink piles." Local farmers believed that the heap roasting process was poisoning the nearby soils. (URS 1993)

A slag brick platform was used for the initial burning, or heap roasting, of the ore. T he ore was piled on the brick platform to an approximate depth of 4 feet. Cord wood was then stacked on top of the ore pile and ignited. T he tellurium in the ore would be vaporized during this process, thus freeing the gold and copper for smelting. T he location of this brick platform is where the Northport city wells are currently located. Refer to Appendix G for Northport city

wells analytical results collected by Stevens County. (URS 1993)

T he burned ore was then placed into the furnace where the separation of the minerals took place. Limerock was used during the flux process. T ap holes were located at different levels in the furnace to filter the minerals and rocks (including copper, iron and slag rock). T he tap hole for the iron and slag rock was located higher than the copper tap hole. T he iron and slag rock collected from this filtration was considered waste. T he copper mineral was collected and loaded into box cars for shipment to a copper refinery. (URS 1993)

Because gold is heavy, it settled to the bottom of the furnace and formed a gold matte. After the gold accumulated to a thickness of 14 inches, the furnace was shut down. Once the furnace and materials cooled, the sides of the furnace were removed to gain access to the gold matte, which was then pried from the furnace and cut into pieces before being loaded into box cars and shipped to a gold refinery. (URS 1993)

T he lead smelter used a process more sophisticated than that used in the copper and gold process of the previous decade, although a large quantity of sulfur (approximately 30 tons per day) was still being discharged into the air. Filters for the smokestacks were added later. (URS 1993)

In the days of the copper and gold smelter, two large steam engines, fueled by coal, provided power. Both flywheel steam engines were hooked onto one long line shaft. On the other end of the line shaft, a dynamo produced 10,000 volts of electricity prior to being boosted by a generator that provided up to 100,000 volts. Once the smelter reopened to process lead ores, a high-voltage line from Canada supplied the power, and the steam plant was shut down. (URS 1993)

T he abandoned and dismantled smelter remained inactive after closure in 1922. T he town of Northport demolished the buildings for the usable brick. One building retained enough walls to provide an ice-skating rink during the winter. T he railroad was abandoned and the tracks salvaged. (URS 1993)

T he smelt ing operations produced a t ailings waste referred to as slag. T he slag was usually placed in piles near the smelter for temporary or permanent disposal. Historical photographs indicate possible tailings piles located on t he northeast port ion of the propert y. T he COCs in the slag are arsenic, copper, lead, mercury, and zinc.

SSF Building Materials, when operational, was one of the largest businesses in Northport, employing from 18 to 25 people. T he entire site was used for the mill. T he sout hern half of the propert y maintained the main lumber operations. T he northern half, which contained

the smelter remnants, was used to store lumber products and old metal parts such as cars, piping, and roofing. T he lumber mill processed mostly cedar wood from rough-dimension lumber into exterior siding and exterior paneling. T he mill process included cutting the wood, drying the cut wood, and shipping it. Mill operations were run on propane. .All water used for the mill operations was obtained from the city water supply. T he mill did not discharge to or collect water from the Columbia River. (URS 1993)

T he scrap wood materials, including sawdust, were sent to Kettle Falls for the Kettle Falls Water Power Company, which burned the material for energy. Originally, the lumber mill burned the scrap wood on site inside a wigwam burner. No wood treatment or chemical use is reported in the past mill operations. (URS 1993)

Environmental concerns in the Northport area have been investigated since 1925. In 1925, the area became involved in the first international case concerning air pollution. T he Washington State Department of Health and Ecology conducted an investigation of the furan and dioxin reported in the Columbia River. A PA and SI was conducted by the EPA in 1993. T he site inspection stated antimony, arsenic, copper, and lead were potentially deposited on site as a result of the former smelter operations, as they were detected on site at significant concentrations. (URS 1993)

Ecology sampled soil and slag piles at the LeRoi/Northport Smelter in 1997. Sample results showed levels of metals two or three orders of magnitude above background. Concentrations of up to 1,010 mg/kg arsenic; 337 mg/kg cadmium; 33,400 mg/kg copper; 20,200 mg/kg lead; and 1,750 mg/kg zinc were detected (Gregory 2000a). Ecology planned to conduct a groundwater investigation at the site; however, due to availability of resources, this has not been pursued (Gregory 2000b).

6.16.4 START-2 Smelter Visit

On June 29 and September 13, 2001, the ST ART-2 visited the LeRoi/Northport Smelter and conducted a visual inspection of the property and surrounding area (Figure 6-16; Appendix A, Photos 33-1 through 34-4, 42-1 through 42-8, 46-4 through 46-10; Appendix B, Boat T eam, Pages 13 through 17; T eam 1 Phase 2, Page 15; T eam 2 Phase 2, Pages 20 through 22). T he ST ART-2 and EPA personnel observed areas of black glassy sand-like material along the bank of the Columbia River. A public boat launch is located directly over this material. T he ST ART-2 characterized the material as slag. Sediment samples were collected at the Columbia River from locations near the boat launch and sand bar/beach area.

On September 13, 2001, the ST ART-2, the EPA T M, Don Hurst of Fulcrum Environmental, and the property owner conducted a walk-through of the property. An area where slag bricks had been deposited was observed south of the former smelter operations. A potential former tailings pile was observed west of the slag brick area. City water wells were observed on the former LeRoi/Northport Smelter property. T he ST ART-2 collected sediment and soil samples from locations on the property. Water samples were not collected from the City supply wells because local officials did not grant EPA permission to access the wells to collect samples.

6.16.5 Sampling Locations

Sample locations are depicted in Figures 6-17 and 6-18. T hree surface soil samples (NSSL01SS through NSSL03SS) were collect ed west of t he former tailings area underneath the slag bricks. T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to consist of very fine to medium grained sand with sandy reddish slag and yellowish stain. No odor was noted during sample collection.

Nine sediment samples (NSSL01SD through NSSL09SD) were collected from slag areas along the Columbia River adjacent to the smelter (PPE 3). T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source in the Columbia River. T he samples appeared to consist of dark brown to black medium sand. No odor or staining was noted during sample collection.

Sediment sample NSPP01SD was collected at t he confluence of the former tailings pile and t he ditch (PPE 1). T he sample appeared to consist of saturated, light brown silt. No odor or staining was noted during sample collect ion

One sediment sample (NSDT 01SD) was collected in the western portion of a recently const ruct ed ditch where the former tailings pile potentially was located (PPE 2). T he sample was collected within the overland surface water drainage routes identified by the ST ART-2. T he sample was collect ed to determine whether pot ential cont aminat ion associated with the tailings pile is migrat ing t o surface water. T he sample appeared to consist of light brown sand fine to medium coarse grained. No odor or staining was noted during sample collection.

6.16.6 Analytical Results

6.16.6.1 Surface Soil Sample Results

The START-2 collected three surface soil samples from tailings for TAL metals analyses. Significant concentrations of arsenic ranged from 209 mg/kg to 297 mg/kg. Significant concentrations of cadmium ranged from 26.9 mg/kg to 105 mg/kg. Significant concentrations of copper ranged from 2,430 mg/kg to 14,700 mg/kg. Significant concentrations of lead ranged from 2,600 mg/kg to 10,500 mg/kg. Significant concentrations of mercury ranged from 0.28 mg/kg to 0.40 mg/kg. Significant concentrations of zinc ranged from 978 mg/kg to 5,420 mg/kg. Refer to Table 6-8 for complete data results.

6.16.6.2 Sediment Sample Results

The START-2 collected 9 sediment samples from slag areas along the Columbia River (PPE 3) for TAL metals analyses. One sediment sample was also analyzed for pesticide/PCBs and TOC. Significant/elevated concentrations of arsenic ranged from 7.5 mg/kg to 41.4 mg/kg. Significant/elevated concentrations of cadmium ranged from 1.5 mg/kg to 4.9 mg/kg. Significant/elevated concentrations of copper ranged from an estimated concentration of 238 mg/kg to an estimated concentration of 2,960 mg/kg. Significant/elevated concentrations of lead ranged from 230 mg/kg to 845 mg/kg. Mercury was detected at a significant/elevated concentration of 0.29 mg/kg. Significant/elevated concentrations of zinc ranged from 1,520 mg/kg to 16,900 mg/kg. Refer to Table 6-9 for complete data results.

The START-2 collected two sediment samples from on-site ditches potentially adjacent to former tailings piles (PPE 1 and PPE 2) for TAL metals analyses. Arsenic was detected at elevated concentrations ranging from 17.6 mg/kg to 39.9 mg/kg. Cadmium was detected at elevated concentrations ranging from 2.6 mg/kg to 5.9 mg/kg. Copper was detected at elevated concentrations ranging from 124 mg/kg to 1,090 mg/kg. Lead was detected at elevated concentrations ranging from
87.1 mg/kg to 887 mg/kg. Zinc was detected at elevated concentrations ranging from 92.2 mg/kg to 223 mg/kg. Refer to Table 6-10 for complete data results.

6.17 BLACK ROCK MINE/MILL

6.17.1 Mine/Mill Location

Latitude:	48 52' 13.45"N
Longitude:	117 42' 22.12"W
Legal Description:	Section 24, T ownship 39N, Range 40E
CERCLIS ID:	WAN001002369
County:	Stevens

Contact:

Mick Vaagen and T rent Lang
Vaagen Brothers Lumber
565 W 5th
Colville, Washington 99114
(509) 684-5071

6.17.2 Historical Information

T he Black Rock Mine/Mill is a former lead and zinc mine/mill located in the Northport mining district, Washington (Derkey et al. 1990). T he mine produced six carloads of ore prior to 1920 and 5,280 tons of ore between 1922 and 1924 (Derkey et al. 1990). T otal production was 140,856 pounds of lead; 7,903,447 pounds of zinc, and 377 ounces of silver (Derkey et al. 1990). A new mill was built in 1923 (Battien 1998). T he mine was still producing in 1943, but no production results are available (Battien 1998). By 1964 the mine/mill was under option to American Zinc (Battien 1998). Historical ownership from 1964 to the present is unknown.

6.17.3 Mine/Mill Description/Features

T he Black Rock Mine/Mill is situated on the east side of Deep Creek, 6 miles northeast of Northport, Washington. T he property consists of seven claims and seven acres of deeded land. Ore occurs disseminated along bedding planes in white, nonsilicified dolomitic marble. T wo ore bodies, indicated by drilling, appear to have moderate ore reserves with an average grade of 8% zinc. T he property is developed by a 250-foot incline, 260-foot adit, and considerable drifting and stoping. (Huntting 1956)

6.17.4 START-2 Mine/Mill Visit

On June 19, 2001, the ST ART -2 visited the Black Rock Mine/Mill and conducted a

visual inspection of the property and the surrounding area (Figure 6-19; Appendix A, Photos 15-21 through 16-13; Appendix B, Team 1 Phase 1, Pages 10 through 12). The mine/mill area consisted of a waste rock pile measuring 180 feet by 120 feet by 30 feet deep located east and adjacent to Northport/Alladin Road. A shaft was identified adjacent to the waste rock pile on the southern portion measuring 10 feet by 5 feet by unknown depth. No water was flowing from the shaft. The remnants of a mill building and two sorting bins were located. The collapsed mill building measured 15 feet by 20 feet and was located adjacent to the waste rock pile on the southern portion and west of the shaft. One sorting bin was located within the waste rock pile and measured 10 feet by 10 feet. The second sorting bin or potential collapsed building was located east of the waste rock pile and measured 10 feet by 10 feet. A residence was located 20 feet west of Northport/Alladin Road. Farm buildings were located 40 feet west of Northport/Alladin Road. No PPEs were identified by the ST ART-2. Access to the mine/mill is unrestricted and the ST ART-2 noted evidence of people removing waste rock from the property. No logging or grazing was noted in the mine/mill area.

6.17.5 Sample Locations

Sample locations are depicted in Figure 6-20. Three waste rock samples(BRWP01SS through BRWP03SS) were collected from the waste rock pile. The samples were collected within the overland surface water drainage routes identified by the ST ART-2. The samples were collected to determine potential contamination associated with this source. The samples appeared to consist of light brown medium sand with gravel. No odor or staining was noted during the sample collection.

Two surface soil samples (BRMS01SS and BRMS02SS) were collected near the collapsed mill building. The samples were collected within the overland surface water drainage routes identified by the ST ART-2. The samples were collected to determine potential contamination associated with this source. The samples appeared to consist of light brown loamy sand. No odor or staining was noted during sample collection.

6.17.6 Analytical Results

6.17.6.1 Surface Soil Sample Results

The ST ART-2 collected five surface soil samples for TAL metals analyses: three

waste rock samples (BRWP01SS through BRWP03SS) and two surface soil samples (BRMS01SS and BRMS02SS) near the collapsed mill building.

In waste rock samples, significant concentrations of cadmium ranged from 688 mg/kg to 1,090 mg/kg. Significant concentrations of copper ranged from 228 mg/kg to 398 mg/kg. Significant concentrations of lead ranged from 555 mg/kg to 1,040 mg/kg. Significant concentrations of mercury ranged from 10 mg/kg to 26.4 mg/kg. Significant concentrations of zinc ranged from 141,000 mg/kg to 207,000 mg/kg.

In soil samples collect ed near the collapsed mill building, significant concentrations of cadmium ranged from 27.3 mg/kg to 1,630 mg/kg. A significant concentration of copper was detected at 192 mg/kg. A significant concentration of lead was detected at 1,800 mg/kg. A significant concentration of mercury was detected at 0.19 mg/kg. Significant concentrations of zinc ranged from 7,500 mg/kg to 402,000 mg/kg. Refer to T able 6-11 for complete data results.

6.18 GREAT WESTERN MINE

6.18.1 Mine Location

Latitude: 48- 52' 06.24"N

Longitude: 117- 41' 48.48"W

Legal Description: SE¼ Section 24, T ownship 39N, Range 40E

CERCLIS ID: WAN001002377

County: Stevens

Contact: Mick Vaagen and Trent Lang

Vaagen Brothers Lumber 565 W 5th Colville, Washington 99114
(509) 684-5071

6.18.2 Historical Information

T he Great Western Mine is a former lead and zinc mine located six miles from Northport, Washington, one and one half miles off Deep Creek Road, near Black Rock and Last Chance mines/mills (Derkey et al. 1990; Battien 1998). T he mine produced $40,000 prior to 1917 (Derkey et al. 1990). T otal production was 434,072 pounds of lead, 125 ounces of silver, 936.524 pounds of zinc (Derkey et al. 1990). In 1943, the mine was owned by L.J. Magney

(Battien 1998). Historical ownership information from the time reported to the present is unknown.

6.18.3 Mine Description/Features

T he Great Western Mine is in the middle dolomite unit of the Metaline Formation (Derkey et al. 1990). The mine consists of two claims known as Great Western and Empire. The ores are chiefly carbonate of zinc with some carbonate of lead, together with a subordinate amount of galena and sphalerite (Weaver 1920). T he known length of the mineralized zone is 1,000 feet. The mine is developed by 1,000 feet of adits and about 200 feet in 3 shafts. (Huntting 1956)

6.18.4 START-2 Mine Visit

On June 21, 2001, the ST ART-2 visited the Great Western Mine and conducted a visual inspection of the property and the surrounding area (Figure 6-21; Appendix A, Photos 17-23 through 18-13; Appendix B, T eam 1 Phase 1, Pages 15 through 17). T he mine area consisted of three waste rock piles, three shafts or shaft systems, and two adits. Waste rock pile 1 was located adjacent to shaft 1 system and measured 18 feet by 30 feet by 3 feet deep. Shaft 1 system comprised 3 shafts within 30 feet of each other. No discharge was noted by the ST ART-2. West of shaft 1 system and waste rock pile 1 was shaft 2 which measured 15 feet across. No waste rock pile was associated with this shaft and no discharge was noted by the ST ART-2. Continuing west, waste rock pile 2 and shaft 3 were located. Waste rock pile 2 measured 18 feet by 30 feet by 3 feet deep. Approximately 120 feet west of shaft 3 and waste rock pile 2 was adit 1 measuring 10 feet by 5 feet by unknown depth. Adit 1 was located on the east side of Knudson Road; no drainage was noted by the ST ART-2. Waste rock pile 3 was located on the west side of the Knudson Road and measured 90 feet by 90 feet by 6 feet deep. A collapsed adit house and adit 2 were located adjacent to waste rock pile 3 on the northern side. No drainage from this adit was noted by the ST ART-2. No PPEs were identified by the ST ART-2. Access to the mine is unrestricted. T he ST ART-2 noted evidence of grazing and logging within 0.25 mile of the mine.

6.18.5 Sampling Locations

Sample locations are depicted in Figure 6-22. T wo waste rock samples(GWWP01SS and GWWP02SS) were collected from the waste rock pile south of Knudson Road. T he

samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to consist of brown coarse sand and gravel. No odor or staining was noted during the sample collection.

6.18.6 Analytical Results

6.18.6.1 Surface Soil Sample Results

T he ST ART-2 collected two surface soil samples from waste rock for T AL metals analyses. Significant concentrations of cadmium ranged from 166 mg/kg to 490 mg/kg. Significant concentrations of lead ranged from 6,200 mg/kg to 24,000 mg/kg. Significant concentrations of mercury ranged from
2.5 mg/kg to 4.3 mg/kg. Significant concentrations of zinc ranged from 52,700 mg/kg to 118,000 mg/kg. Refer to T able 6-12 for complete data results.

6.19 LAST CHANCE MINE/MILL

6.19.1 Mine/Mill Location

Latitude: 48- 51' 59.40"N

Longitude: 117- 41' 56.40"W

Legal Description: SW¼ SE¼ Section 24, T ownship 39N, Range 40E

CERCLIS ID: WASFN1002162

County: Stevens

Contact: Mick Vaagen and T rent Lang

Vaagen Brothers Lumber 565 W 5th Colville,
Washington 99114 (509) 684-5071

6.19.2 Historical Information

T he Last Chance Mine/Mill is a former lead, silver, and zinc mine/mill located 5 miles southeast of Northport, Washington (Derkey et al. 1990; E & E 2000). From Northport, the

mine/mill is accessed via Colville-Aladdin Northport Road, which runs on the west side of the property (E & E 2000). The mine/mill is reported to have produced $600,000 prior to 1937 (Derkey et al. 1990). One carload of ore was shipped in 1938 and small amounts of concentrate were shipped between 1947 and 1949 (Derkey et al. 1990). Between 1904 and 1954, the mine/mill produced 5,937,708 pounds of lead; 18,567 pounds of silver; and 110,110 pounds of zinc (Derkey et al. 1990). T he construction of the floatation mill is reported to have begun in 1940 (E & E 2000). Juniper Lead Company owned the mine/mill from 1907 to 1926 (E & E 2000). Reports indicate that in 1938 the property was owned by Mrs. A. Baker, the widow of the previous owner Al Baker (E & E 2000). Last Chance Consolidated Mines, Inc., was listed as the owner since 1948 (Battien 1998). Historical ownership information from 1948 to the present is unknown.

6.19.3 Mine/Mill Description/Features

T he Last Chance Mine/Mill consists of three patented claims and a mill site (Huntting 1956). T he mine is in the middle dolomite of the Metaline Formation (Mills 1977). Ore shoots occur in a mineralized shear zone in dolomite, especially at fracture intersections. The zone is as much as 5 feet wide (Huntting 1956). T wo distinct veins are remarkably uniform in strike and dip over a combined strike length of 650 feet and a dip length of at least 500 feet. The veins are emplaced along faults and
appear parallel or sub-parallel to bedding (Mills 1977). T he property is developed by four adits, more than 1,000 feet in open cuts and trenches, and a 60-ton gravity-floatation mill (Huntt ing 1956).

6.19.4 START-2 Mine/Mill Visit

On June 20, 2001, the ST ART-2 visited the Last Chance Mine/Mill and conduct ed a visual inspection of the property and surrounding area (Figure 6-23; Appendix A, Photos 16-14 through 17-22; Appendix B, T eam 1 Phase 1, Pages 13 and 14). T he mine/mill area consisted of two waste rock piles. T he larger pile was located north of the north shaft and measured 1,320 feet by 75 feet by 2 feet deep. T he smaller waste rock pile was located west of the north shaft and measured 75 feet by 45 feet by unknown depth. A tailings pile surrounding a former house or office and mill building was locat ed west of the waste rock piles and measured 600 feet by 105

feet by 3 feet deep. East of the waste rock piles and the abandoned road the ST ART-2 located a north and south shaft and an adit upgradient from the north shaft. A seep was located near the mouth of the south shaft which flows into the unnamed creek. Further east of the shafts, an unnamed creek was documented. T he shaft discharge flowed into the unnamed creek (PPE 1) and cont inued west past the waste rock piles, through the t ailings pile (PPE 2) and infiltrated the ground prior to reaching the Colville-Alladin Northport Road. South of the point of infiltration, a drainage ditch and culvert were observed. T he potential flow from the culvert travels by sheet flow into Deep Creek. Access to t he mine/mill is unrestricted. No logging or grazing was noted in the mine/mill area.

6.19.5 Sampling Locations

Sample locations are depicted in figure 6-24. T hree waste rock samples(LCWP01SS through LCWP03SS) were collected from the larger waste rock pile located north of the north shaft. T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to consist of dry, brown, fine sand/silt. No odor or staining was noted during sample collection.

T hree t ailings samples (LCT P01SS through LCT P03SS) were collected from t he t ailings pile locat ed near the former mill building. T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to consist of brown-orange fine sand/silt . No odor was noted during sample collection.

T hree surface soil samples (LCMS01SS through LCMS03SS) were collected from the former mill building area. T he samples appeared to consist of medium brown, fine sand with gravel. No odor was noted during sample collection.

One surface water sample was collected from the discharge of water originating at the shaft (LCAD01SW). T he sample was collected within the overland surface water drainage route identified by the ST ART-2. T he sample was collected to determine potential

contamination associated with this source. T he sample was clear and no odor or staining was noted during sample collection.

Sediment sample LCPP01SD was collected at the confluence of the adit discharge and the unnamed creek (PPE 1). T he sample appeared to consist of gray-brown-black medium sand with gravel. T he sample was wet with an organic odor. No staining was noted during sample collection.

Sediment sample LCPP02SD was collected at the confluence of the tailings and the unnamed creek (PPE 2). T he sample appeared to consist of black-brown medium sand/silt. T he sample was wet with no odor. No staining was noted during sample collection.

6.19.6 Analytical Results

6.19.6.1 Surface Soil Sample Results

T he ST ART -2 collected nine surface soil samples for T AL metals analyses: three waste rock samples (LCWP01SS through LCWP03SS); three tailings samples (LCT P01SS through LCT P03SS); and three surface soil samples from the former mill building area (LCMS01SS through LCMS03SS).

In waste rock samples, significant concentrations of cadmium ranged from 285 mg/kg to 349 mg/kg. Significant concentrations of lead ranged from 113,000 mg/kg to 170,000 mg/kg. Significant concentrations of mercury ranged from 1.5 mg/kg to 2.7 mg/kg. Significant concentrations of zinc ranged from 67,700 mg/kg to 89,800 mg/kg.

In tailings samples, significant concentrations of cadmium ranged from 269 mg/kg to 518 mg/kg. Significant concentrations of lead ranged from 72,900 mg/kg to 110,000 mg/kg. Significant concentrations of mercury ranged from 1.3 mg/kg to 2.3 mg/kg. Significant concentrations of zinc ranged from 63,900 mg/kg to 112,000 mg/kg.

In soils samples collected from the former mill building area, significant concentrations of cadmium ranged from 136 mg/kg to 471 mg/kg. Copper was detected at a significant concentration of 2,790 mg/kg. Significant concentrations of lead ranged from 18,000 mg/kg to 86,200 mg/kg. Significant concentrations of mercury ranged from 1.3 mg/kg to 2.6 mg/kg. Significant concentrations of zinc ranged from 36,900 mg/kg to 107,000 mg/kg. Refer to T able 6-13 for complete data results.

6.19.6.2 Surface Water Sample Results

T he surface water sample (LCAD01SW) collected at the shaft contained zinc at an estimated concentration of 459 .g/L.

6.19.6.3 Sediment Sample Results

T he ST ART-2 collected two sediment samples at PPEs to the on-site unnamed creek for T AL metals analyses. Cadmium was detected at a elevated concentration of 56.9 mg/kg. Elevated concentrations of lead ranged from 385 mg/kg to 14,600 mg/kg. Elevated concentrations of mercury ranged from 0.46 mg/kg to 1.2 mg/kg. Elevated concentrations of zinc ranged from 1,100 mg/kg to 13,400 mg/kg. Refer to T able 6-14 for complete data results.

6.20 DEEP CREEK MINE

6.20.1 Mine Location

Latitude: 48- 51' 48.96"N

Longitude: 117- 42' 54.36"W

Legal Description: N½ NE¼ Section 26, T ownship 39N, Range 40E

CERCLIS ID: WASFN1002161

County: Stevens

Contact: T erry Richmond

Richmond Family Trust

448 North Walnut

Colville, Washington 99114
(509) 684-3033

6.20.2 Historical Information

T he Deep Creek Mine is a former lead, silver, and zinc mine located west of Deep Creek and approximately 7 miles south of Northport, Washington (Derkey et al. 1990, E & E 2000).

From Northport the property is accessed via the Colville-Alladin Northport Road, which runs on the east side of the property (E & E 2000). T he mine is reported to have produced from 1944 to 1955 (Derkey et al. 1990). Previous owners include the Northport Mining Company (1919-1921); Anaconda Copper Mining Company (1926-1941); Western Knapp Engineering Company (1941-1944); Jamison-Higginbotham Partnership (1944-1947); Goldfields Consolidated Mines (1947-1964); American Zinc Company (1964-1971); Columbia Resources, Inc. (1971-1979); and Great Basins Petroleum, Inc., from 1979 to the
current owner, the Richmond Family T rust (E & E 2000). T here are no records available after 1979 with regards to ownership changes, and no information is available regarding other periods of ownership.

6.20.3 Mine Description/Features

T he Deep Creek Mine is located approximately 100 yards from the west bank of Deep Creek. Mineralization occurs in the Metaline Formation (Derkey et al. 1990). T he mine was operated from approximately 1944 to 1956, when the mine was shut down (E & E 2000). T he maximum depth of development was 850 feet bgs. According to tabulations in 1958, the following quantities of metals were obtained from a total ore production of 763,307 tons: 24,000 pounds of copper; 69 ounces of gold; 15,000,000 pounds of lead; 36,000 ounces of silver; and 66,000,000 pounds of zinc (E & E 2000). T he mine was closed in 1956 due to a combination of factors including a shaft fire, rising mining costs, and declining metal prices (E & E 2000). Following the closure, the headframe, hoisting, pumping, and other machinery were removed, and the mine was allowed to flood to within several feet of the shaft collar. (E & E 2000)

6.20.4 START-2 Mine Visit

On June 20, 2001, the ST ART -2 visited the Deep Creek Mine and conducted a visual inspection of the property and surrounding area (Figure 6-25; Appendix A, Photos 21-21 through 24-8; Appendix B, T eam 2 Phase 1, Pages 6 and 7). T he mine area consisted of four waste rock piles. Waste rock pile 1 located adjacent to Deep Creek measured 20 feet by 20 feet by 5 feet deep. T here could be potential overland flow from waste rock pile 1 to Deep Creek (PPE 1). T he flow of Deep Creek was estimated by the ST ART -2 at 100 cfs. Waste rock pile 2 located adjacent to the main road measured 60 feet by 20 feet by 10 feet deep. Waste rock pile 3 located

west of the pad with power tower and fence measured 100 feet by 30 feet by 10 feet deep. Waste rock pile 4 located near an adit on the south end of the property measured 40 feet by 20 feet by 5 feet deep. T he roads on the mine property were comprised of waste rock. T he entrance road measured 700 feet by 20 feet by 2 feet deep. T he road heading south to the adit measured 400 feet by 15 feet by 2 feet deep and also consisted of tailings. T ailings were found scattered throughout the mine area. Concentrated areas were located in two on-site wet areas (one on the south end of the property near the adit measuring 15 feet by 15 feet and one south of the main entrance road measuring 30 feet by 30 feet) and north and west of waste rock pile 2 adjacent to the entrance road. A swampy area was located south of the gated entrance and measured 150 feet by 100 feet. T here could be potential flow from this swampy area to Deep Creek (PPE 2). T he pad with power tower and fence located between the two wet areas measured 25 feet by 40 feet. A garbage and debris pile was located adjacent to the main road and measured 50 feet by 20 feet by 5 feet deep. West of the garbage and debris pile was an assay building measuring 20 feet by 20 feet . Furt her west and nort h four buildings were identified. Building 1 measured 50 feet by 40 feet and contained a winch and four small transformers. Building 2 measured 100 feet by 45 feet and contained two small transformers, motor and pumps; and a foundation. Building 3 measured 40 feet by 40 feet. Building 4 measured 30 feet by 30 feet. Other features on the south end of the property include a concrete pad, a shaft, and a pond. T he concrete pad measured 15 feet by 20 feet. T he adit in this area measured 4 feet by 3 feet by unknown depth. T he adit was not flowing; however, standing water was present. T he shaft measured 5 feet by 5 feet by approximately 800 feet deep. T he pond measured 20 feet by 20 feet by 5 feet deep. A locked gate was present at the mine; however, one could cross the creek to gain access to the property. A residence was located to the east of the mine and outside of the gated area. No logging or livestock grazing was noted in the vicinity.

6.20.5 Sampling Locations

Sample locations are depicted in Figure 6-26. One waste rock sample (DCWP01SS) was collected from waste rock pile 1 located adjacent to Deep Creek. T he sample was collected within the overland surface water drainage route identified by the ST ART-2. T he sample was collected to determine potential contamination associated with this source. T he sample appeared to consist of white, quartz-like rock. No odor or staining was noted during sample collection.

T hree waste rock samples (DCWP02SS through DCWP04SS) were collected from

the waste rock comprising the main road. T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to consist of white, quartz-like rock. No odor or staining was noted during sample collection.

One waste rock sample (DCWP05SS) was collected from waste rock pile 3 located west of the pad with power tower and fence. T he sample was collected within the overland surface water drainage route identified by the ST ART-2. T he sample was collected to determine potential contamination associated with this source. T he sample appeared to consist of white, quartz-like rock. No odor or staining was noted during sample collection.

Nine t ailings samples (DCT P01SS t hrough DCT P09SS) were collect ed from the nort hern port ion of the mine area. T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to consist of fine, light brown, dry soil. No odor or staining was noted during sample collection.

T hree t ailings samples (DCT P10SS through DCT P12SS) were collected from t he wet area located north of the pad with power tower and fence. T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to consist of fine, light brown, dry soil. No odor or staining was noted during sample collection.

T hree t ailings samples (DCT P13SS through DCT P15SS) were collected on the road leading to the adit. T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to consist of fine, light brown, dry soil with some white quartz-like rocks. No odor or staining was noted during sample collection.

T hree t ailings samples (DCT P16SS through DCT P18SS) were collected from t he wet area nort h of the adit. T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source, T he samples appeared to consist of fine, brown, moist soil. No odor or staining was noted during sample collection.

One surface water sample (DCAD01SW) was collected from the adit. T he sample was collected within the overland surface water drainage route identified by the ST ART-2. T

he sample was collected to determine potential contamination associated with this source. T he sample was clear. No odor or staining was noted during sample collection.

6.20.6 Analytical Results

6.20.6.1 Surface Soil Sample Results

T he ST ART-2 collected 23 surface soil samples for T AL metals analyses: five waste rock samples (DCWP01SS through DCWP05SS) and eighteen tailings samples (DCT P01SS t hrough DCT P 18SS).

In waste rock samples, significant concentrations of cadmium ranged from 24.9 mg/kg to 25.2 mg/kg. Significant concentrations of lead ranged from 558 mg/kg to 799 mg/kg. Significant concentrations of mercury ranged from 0.14 mg/kg to 0.25 mg/kg. Significant concentrations of zinc ranged from 4,220 mg/kg to 7,780 mg/kg for zinc.

In tailings samples, significant concentrations of cadmium ranged from 23.8 mg/kg to 425 mg/kg. Significant concentrations of lead ranged from 632 mg/kg to 13,300 mg/kg. Significant concentrations of mercury ranged from 0.17 mg/kg to 3.2 mg/kg. Significant concentrations of zinc ranged from 4,240 mg/kg to 123,000 mg/kg for zinc. Refer to Table 6-15 for complete data results.

6.20.6.2 Surface Water Sample Results

Analytes detected in the surface water collected from the adit (DCAD01SW) include lead at

1. 12.9 .g/L and zinc at an estimated concentration of 558 .g/L.
2. **6.21 COPPER KING MINE**

6.21.1 Mine Location

Latitude: 48- 46' 51.60"N

Longitude: 117- 39' 12.24"W

Legal Description: Section 20, T ownship 38N, Range 41E

CERCLIS ID: WAN001002370

County: Stevens

Contact: Mick Vaagen and Trent Lang

Vaagen Brothers Lumber
565 W 5th

Colville, Washington 99114
(509) 684-5071

6.21.2 Historical Information

T he Copper King Mine is a former copper and silver mine located in the Northport mining district, Washington (Derkey et al. 1990). The mine is reported to have produced between 1904 and 1941 (Derkey et al. 1990). Copper King Mining Company owned the mine from 1905 to 1907 (Battien 1998). United Copper Company operated the mine from 1916 to 1918 and by 1930 ownership changed to Northwest Mines Corporation. In 1950, the mine was owned by Banner Mining Company and in 1976 the mine had been acquired by an eastern syndicate (Battien 1998). Historical ownership information from 1976 to the present is unknown.

6.21.3 Mine Description/Features

T he Copper King Mine is in a shear zone between the upper and lower units of the Wallace Formation (Derkey et al. 1990). T he mine consists of two claims known as the Copper King No. 1 and
No. 2. T he property is developed by a lower tunnel driven for a distance of 221 feet, an upper tunnel driven for a distance of 285 feet, and a 20-foot shaft (Weaver 1920). T he veins range up to 30 feet wide and a low-grade ore body was reported to be 40 feet wide and 500 feet long (Derkey et al. 1990). T he ore deposit occurs along the contact between limestone and an intrusive dike (Huntting 1956).

6.21.4 START-2 Mine Visit

On June 19, 2001, the ST ART-2 visited the Copper King Mine and conducted a visual inspection of the property and surrounding area (Figure 6-27; Appendix A, Photos 15-6 through 15-20; Appendix B, T eam 1 Phase 1, Pages 8 through 10). T he mine area consisted of two waste rock piles. One waste rock pile was located east of Alladin Road and southwest of adit 1 and measured 60 feet by 30 feet by 3 feet deep. Adit 1 measured 5 feet by 10 feet. No flow or drainage was noted by the ST ART-2. Adit 2 was located east of adit 1 and measured 5 feet by 10 feet. Adit drainage flowed approximately 75 feet southwest before infiltrating the ground. T

here is a potential that during heavy flow adit 2 discharge could reach Deep Creek (PPE 1). A retention area was documented where the adit discharge infiltrates the ground measuring 5 feet by 1 feet by 1 feet deep. T he retention area was composed of small logs and plastic sheeting which was estimated to retain approximately 15 gallons. A hose was noted south of the retention area extending southwest for approximately 20 feet. T o the east of adit 2 the ST ART-2 identified a second waste rock pile and shaft. T he waste rock pile measured 75 feet by 120 feet by 6 feet deep. T he shaft was surrounded by the waste rock and measured 15 feet by 20 feet by unknown depth. Standing water was noted. No buildings or evidence of buildings were noted on the property. Access to the mine is unrestricted and the ST ART-2 noted recent logging. T he ST ART-2 also noted grazing in the area near adit 2.

6.21.5 Sample Locations

Sample locations are depicted in Figure 6-28. T wo waste rock samples(CKWP01SS and CKWP02SS) were collected from the waste rock pile surrounding the shaft on the northeast portion of the property. T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to consist of fine orange and brown sand with trace gravel and pyrite. No odor or staining was noted during the sample collection.

One surface water sample was collected from the discharge of water originating at adit 2 (CKAD01SW). T he sample was collected within the overland surface water drainage route identified by

the ST ART-2. T he sample was collected to determine potential contamination associated with this source. T he sample was clear. No odor or staining was noted during sample collection.

One sediment sample (CKPP01SD) was collected at the confluence of the adit 2 discharge and the retention area which can flood and flow into Deep Creek (PPE 1). T he sample was collected within the overland surface water drainage route identified by the ST ART-2. T he sample was collected to determine potential contamination associated with this source. T he sample appeared to consist of light brown medium sand with gravel. No odor or staining was noted during sample collection.

6.21.6 Analytical Results

6.21.6.1 Surface Soil Sample Results

T he ST ART-2 collected two surface soil samples from waste rock for T AL metals analyses. Significant concentrations of copper ranged from 559 mg/kg to 1,700 mg/kg. Mercury was detected at a significant concentration of 0.12 mg/kg. Refer to T able 6-16 for complete data results.

6.21.6.2 Surface Water Sample Results

Analytes detected in the surface water sample collected at adit 2 (CKAD01SW) include lead at 17.9 .g/L and zinc at an estimated concentration of 180 .g/L.

6.21.6.3 Sediment Sample Results

T he ST ART-2 collected one sediment sample from the retention pond for T AL metals and pesticide/PCBs analyses. No significant concentrations of T AL metals were detected in the sample. Refer to T able 6-17 for complete data results.

6.22 SIERRA ZINC MINE/MILL

6.22.1 Mine/Mill Location

Latitude:	48 46' 28.20"N
Longitude:	117 40' 06.24"W
Legal Description:	Section 20, T ownship 38N, Range 41E
CERCLIS ID:	WAN001002396
County:	Stevens
Contact:	United States Department of the Interior Bureau of Land Management Spokane District Office 1103 N. Fancher Spokane, Washington 99212-1275 (509) 536-1200

6.22.2 Historical Information

T he Sierra Zinc Mine/Mill is a former gold, lead, silver, and zinc mine/mill off Colville-Alladin Northport Road, south of Northport, Washington (Derkey et al. 1990). Sierra Zinc, sometimes called Aladdin or Blue Ridge included eight claims and 180 acres

of deeded ground (Battien 1998). T he mine/mill was located on the west side of Deep Creek and approximately 4 miles north of Aladdin or 17 miles south of Northport (Battien 1998). The mine is reported to have produced in 1909, 1924, 1925, 1941 through 1944, and between 1950 and 1952 (Derkey et al. 1990). A mill was built in 1942 (Battien 1998). In 1924 and earlier, some development work was performed by T .R. Roberts (Battien 1998). Amos E. Huseland filed claims for part of the mine in 1935 (Battien 1998). Other owners include T.C. Higginbotham; Goldfield Consolidated, T ri-Nite, and Coronado. Higginbotham sold the mill to Goldfield Consolidated in 1948 and then bought it back in 1960 (Battien 1998). T ri-Nite purchased the mill in 1962 (Battien 1998). Coronado leased the property with an option to purchase from Tri-Nite in 1972 (Battien 1998). Additional historical ownership from 1972 to the present is unknown.

6.22.3 Mine/Mill Description/Features

T he Sierra Zinc Mine/Mill consists of seven claims. Alternative names include Alladin Mine and Blue Ridge Mine. T he ore deposit consists of galena and sphalerite disseminated in limestone. Quartz veins carry minor amounts of chalcopyrite, galena, molybdenite, pyrite, and sphalerite. T he main ore body mined prior to 1944 measured 300 feet along the strike, 200 feet along the dip, and 4 to 12 feet thick. T hree smaller ore bodies were mined. T he property is developed 8,450 feet in three adits, a 470-foot shaft, and a 300-ton floatation mill. (Huntting 1956)

6.22.4 START-2 Mine/Mill Visit

On June 21, 2001, the ST ART-2 visited the Sierra Zinc Mine/Mill and conducted a visual inspection of the property and surrounding area (Figure 6-29; Appendix A, Photos 24-10 through 28-2; Appendix B, Team 2 Phase 1, Page 8 and supplemental pages supplied by Guy Gregory of Ecology). T he property was accessed by Colville-Aladdin Northport Road. T he mine/mill area consisted of one waste rock pile measuring 100 feet by 50 feet by 5 feet deep. North of the waste rock pile was a tailings pile measuring 1,000 feet by 2,100 feet by an estimated 20 feet deep. T here could be potential overland flow from t he tailings pile to a drainage dit ch (PPE 1) located east of the tailings pile. T he flow of t he drainage ditch was estimat ed by the ST ART-2 to be approximately 0.5 cfs. A mill building was located south of the wast e rock pile and tailings pile measuring 250 feet by 225 feet. Northwest of the mill building an adit was located measuring 2 feet

by 2 feet by unknown depth. T he discharge was estimated by the ST ART-2 at approximately 0.5 gallons per minute (gpm). T he adit water flowed north into the forested area. T hree residences were located south of the property. A fence was noted along a portion of the tailings pile; however, gaps were present in the nort hern fence line. A road with a no trespassing sign was not ed which continued to the sout hern end of the tailings pile and mine/mill area where several houses were located. No fence was observed. No logging or grazing was noted in the vicinity of the property.

6.22.5 Sampling Locations

Sample locations are depicted in Figure 6-30. T welve waste rock samples(SZWP01SS through SZWP12SS) were collected from the waste rock pile. T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to consist of gray, fine, dry sand. No odor or staining was noted during sample collection.

T wenty-one t ailings samples (SZT P01SS through SZT P21SS) were collect ed from the tailings pile area. T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to consist of dark gray, fine, moist to dry soil with some clay. No odor or staining was noted during sample collection.

One surface soil sample (SZMS01SS) was collected from the mill area. T he sample was collected within the overland surface water drainage route identified by the ST ART-2. T he sample was collected to determine potential contamination associated with this source. T he sample appeared to consist of black, fine, slightly moist sand with lumps. No odor was noted during sample collection.

One surface water sample (SZAD01SW) was collected from the adit. T he sample was collected within the overland surface water drainage route identified by the ST ART-2. T he sample was collected to determine potential contamination associated with this source. T he sample was clear. No odor or staining was noted during sample collection.

6.22.6 Analytical Results

6.22.6.1 Surface Soil Sample Results

T he ST ART -2 collected 34 surface soil samples for T AL metals analyses: twelve waste rock samples (SZWP01SS through SZWP12SS); twenty-one tailings samples (SZT P01SS through SZT P21SS); and one surface soil sample (SZMS01SS) from the mill area.

In waste rock samples, significant concentrations of cadmium ranged from 27.2 mg/kg to 121 mg/kg. A significant concentration of copper was detected at 181 mg/kg. Significant concentrations of lead ranged from 871 mg/kg to 15,800 mg/kg. Significant concentrations of mercury ranged from
0.17 mg/kg to 1.6 mg/kg. Significant concentrations of zinc ranged from 3,820 mg/kg to 32,200 mg/kg.

In tailings samples, significant concentrations of cadmium ranged from 23.4 mg/kg to 130 mg/kg. Significant concentrations of copper ranged from 180 mg/kg to 443 mg/kg. Significant concentrations of lead ranged from 917 mg/kg to 5,110 mg/kg. Significant concentrations of mercury ranged from
0.21 mg/kg to 2.7 mg/kg. Significant concentrations of zinc ranged from 3,560 mg/kg to 33,400 mg/kg.

In the surface soil sample collected from the mill area, cadmium was detected at a significant concentration of 78.2 mg/kg, copper was detected at a significant concentration of 443 mg/kg, lead was detected at a significant concentration of 4,850 mg/kg, mercury was detected at a significant concentration of 0.97 mg/kg, and zinc was detected at a significant concentration of 17,500 mg/kg. Refer to Table 6-18 for complete data results.

6.22.6.2 Surface Water Sample Results

Analytes detected in the surface water sample collected from the adit (SZAD01SW) include zinc at an estimated concentration of 292 .g/L.

6.2 MAGMA MINE

3

6.23.1 Mine Location

Latitude:	48 46' 00.48"N
Longitude:	117 38' 25.08"W
Legal Description:	E½ SW¼ Section 28, T ownship 38N, Range 41E

CERCLIS ID:	WAN001002387
County:	Stevens
Contact:	Colville National Forest 765 South Main Colville, Washington 99114

6.23.2 Historical Information and Mine Description/Features

T he Magma Mine is a former copper, gold, lead, silver, and zinc mine located in the Northport district, Washington. Alternate names are Easy Money Mine and Eldorado Mine. T he mine reportedly produced 5 tons of ore in 1927. T he property was listed under the Magma Molybdenum Mines Company (1921-1943) and the Magma Mines & Metals Company (1930). Additional historical ownership information is unknown. T he ore minerals are galena, molybdenite, pyrite, scheelite, and sphalerite. T he property is developed by a 610-foot adit, a 110-foot shaft, and 1,800 feet of other workings. (Huntting 1956)

6.23.3 START-2 Mine Visit

On June 28, 2001, the ST ART -2 visited the Magma Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 2 Phase 1, Page 28). T he area consisted of a waste rock pile, a collapsed shaft, and the remnants of two sheds (Appendix A, Photos 32-8 through 32-11). T he waste rock pile measured an estimated 50 feet by 30 feet with an average depth of 15 feet and the shaft opening measured approximately 5 feet by 5 feet. T he ST ART -2 did not observe any overland drainage routes from the waste rock pile or shaft to surface water. Access to the mine is restricted with a locked gate. No residents or potential receptors were observed on the property. No samples were collected at the Magma Mine.

6.2 FARMER MINE
4

6.24.1 Mine Location

Latitude:	48-50' 59.28"N
Longitude:	117 37' 17.40"W
Legal Description:	Section 34, T ownship 39N, Range 41E
CERCLIS ID:	WAN001002373

County:	Stevens
Contact:	Mick Vaagen and T rent Lang Vaagen Brothers Lumber 565 W 5th Colville, Washington 99114

6.24.2 Historical Information and Mine Description/Features

T he Farmer Mine is a former lead, silver, and zinc mine located at the south end of Deep Lake in Stevens County, Washington. Historical ownership information from the time of patent to the present is unknown. T he mine consists of two claims known as King T ut No. 1 and No. 2. T he mineralized zone is 2 to 20 feet wide in limestone and has been traced for 600 feet. T he property is developed by a 135-foot adit, a smaller adit, 150 feet of shaft work, and an open pit. (Huntting 1956)

6.24.3 START-2 Mine Visit

On June 19, 2001, the ST ART -2 visited the Farmer Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 1 Phase 1, Page 6). T he area consisted of a shaft and an adit. T he adit was not flowing at the time of the visit (Appendix A, Photos 14-21, 14-22). T he ST ART-2 did not observe any overland drainage routes from the shaft or adit to surface water. Access to the mine was unrestricted. No residents or potential receptors were observed on the property. No samples were collected at the Farmer Mine.

6.2 MAKI MINE
5

6.25.1 Mine Location

Latitude:	48 50' 45.60"N
Longitude:	117 36' 00.00"W
Legal Description:	Section 35. T ownship 39N, Range 41E
CERCLIS ID:	WAN001002388
County:	Stevens
Contact:	Mick Vaagen and T rent Lang Vaagen Brothers Lumber 565 W 5th Colville, Washington 99114

6.25.2 Historical Information and Mine Description/Features

T he Maki Mine is a former cobalt, lead, and zinc mine located at the south end of Deep Lake in Stevens County, Washington. Historical ownership information from the time of patent to the present is unknown. T he property encompasses 160 acres of deeded land. T he ore body is 50 to 100 feet thick and 600 feet long in gray limestone. T he property is developed by 125 feet of workings in four shafts and a number of open cuts. (Huntting 1956)

6.25.3 START-2 Mine Visit

On June 19, 2001, the ST ART-2 visited the Maki Mine and conducted a visual inspection of the property and surrounding area (Appendix B. Team 1 Phase 1. Page 7). The area consisted of two waste rock piles and two shaft systems (Appendix A. Photo 14-24, 15-1 through 15-5). The volume of one waste rock pile was estimated to be 500 cubic yards, the other at 200 cubic yards. The adit was not flowing at the time of the visit. The START -2 did not observe any overland drainage routes from the waste rock piles or shafts to surface water. No residents or potential receptors were observed on the property. No samples were collected at the Maki Mine.

6.26 ELECTRIC PO INT MINE/MILL

6.26.1 Mine/Mill Location

Latitude:	48 52' 56.28"N
Longitude:	117 32' 29.04"W
Legal Description:	Sections 17and 18; T ownship 39N; Range 42E
CERCLIS ID:	WAN001002372
County:	Stevens
Contact:	Mick Vaagen and T rent Lang Vaagen Brothers Lumber 565 W 5th Colville, Washington 99114 (509) 684-5071

6.26.2 Historical Information

T he Electric Point Mine/Mill is a former copper, lead, silver, and zinc mine/mill

located 4 miles east of Leadpoint, Washington (Derkey et al. 1990; Battien 1998). T he mine is reported to have produced from 1901 to 1955 (Derkey et al. 1990). Total production was 30,711,917 pounds of lead, 7,154 ounces of silver, and 10,691 pounds of zinc (Derkey et al. 1990). The State Mining Company owned the mine/mill as of 1975 (Battien 1998). Historical ownership information from 1975 to the present is unknown.

6.26.3 Mine/Mill Description/Features

T he Electric Point Mine/Mill is developed by 10,000 feet of drifts and crosscuts and several thousand feet of shafts (Huntting 1956). There are two shafts and eight 100-foot levels from which the ore columns or "chimneys" were reached. A tunnel on the 300-foot level extended to the surface on the
south side of the hill on which the mine is situat ed. Production of carbonate ore (30,438,010 tons) averaged about 25% lead, while the production of sulfide ore (21,569,146 tons) averaged 69% lead. T he ore occurred in large chimneys of anglesite, cerussite, galena, and iron oxide and brecciated dolomite or magnesian limestone. (Jenkins 1924)

6.26.4 START-2 Mine/Mill Visit

On June 22, 2001, the ST ART-2 visited the Electric Point Mine/Mill and conducted a visual inspection of the property and surrounding area (Figure 6-31; Appendix A, Photos 19-14 through 20-17; Appendix B, T eam 1 Phase 1, Pages 21 and 22). T he mine/mill area consisted of two waste rock piles. Waste rock pile 1 measured 180 feet by 300 feet by 6 feet deep. T wo collapsed shafts were located west and adjacent to waste rock pile 1. T he shaft area measured 60 feet by 60 feet. East of waste rock pile 1 was a collapsed mill measuring 75 feet by 30 feet. Further east , waste rock pile 2 and an ore loading building were located. Waste rock pile 2 measured 75 feet by 120 feet by 6 feet deep. T he ore loading building measured 20 feet by 10 feet by 10 feet. East of t he ent rance road a dry tailings pond was located measuring 90 feet by 75 feet by 3 feet deep. No PPEs were identified by the ST ART-2. Access to the mine/mill is unrest ricted. No logging or grazing was not ed in t he mine/mill area.

6.26.5 Sampling Locations

Sample locations are depicted in Figure 6-32. Five waste rock samples(EPWP01SS through EPWP05SS) were collected at the mine/mill. EPWP01SS through EPWP03SS were collected from waste rock pile 1. The samples were collected within the overland surface water drainage routes identified by the START-2. The samples were collected to determine potential contamination associated with this source. The samples appeared to consist of fine/medium tan sand with gravel. No odor or staining was noted during sample collection. EPWP04SS and EPWP05SS were collected from waste rock pile 2. The samples were collected within the overland surface water drainage routes identified by the START-2. The samples were collected to determine potential contamination associated with this source. The samples appeared to consist of fine/medium tan sand with gravel. No odor or staining was noted during sample collection.

Three tailings samples (EPT P01SS through EPT P03SS) were collected from the tailings pond. The samples were collected within the overland surface water drainage routes identified by the START-2. The samples were collected to determine potential contamination associated with this source.
The samples appeared to consist of brown/tan/orange fine sand with silt and some gravel. No odor was noted during sample collection.

Three surface soil samples (EPMS01SS through EPMS03SS) were collected from the mill area. The samples were collected within the overland surface water drainage routes identified by the START-2. The samples were collected to determine potential contamination associated with this source. The samples appeared to consist of fine to medium brown-red sandy silt. No odor was noted during sample collection.

6.26.6 Analytical Results

6.26.6.1 Surface Soil Sample Results

The START-2 collected 11 surface soil samples for TAL metals analyses: five waste rock samples (EPWP01SS through EPWP05SS); three tailings samples (EPT P01SS through EPT P03SS); and three surface soil samples (EPMS01SS through EPM03SS) from the mill area.

In waste rock samples, significant concentrations of lead ranged from 4,490 mg/kg to 50,100 mg/kg. Significant concentrations of mercury ranged from 0.20 mg/kg to 0.45 mg/kg. Significant concentrations of zinc ranged from 13,300 mg/kg to 33,800

mg/kg.

In tailings samples, a significant concentration of cadmium was detected at 25.0 mg/kg. Significant concentrations of lead ranged from 15,800 mg/kg to 26,000 mg/kg. Significant concentrations of mercury ranged from 0.14 mg/kg to 0.69 mg/kg. Significant concentrations of zinc ranged from 6,030 mg/kg to 22,000 mg/kg.

In surface soil samples collected from the mill area, significant concentrations of lead ranged from 11,200 mg/kg to 97,800 mg/kg. Significant concentrations of mercury ranged from 0.16 mg/kg to
0.27 mg/kg. Significant concentrations of zinc ranged from 5,080 mg/kg to 10,600 mg/kg. Refer to Table 6-19 for complete data results.

6.2 GLADSTONE MINE/MILL
7

6.27.1 Mine/Mill Location

Latitude:	48 53' 12.48"N
Longitude:	117 32' 35.16"W
Legal Description:	Section 18, T ownship 39N, Range 42E
CERCLIS ID:	WAN001002376
County:	Stevens
Contact:	Mick Vaagen and Trent Lang Vaagen Brothers Lumber 565 W 5th Colville, Washington 99114 (509) 684-5071

6.27.2 Historical Information

T he Gladstone Mine/Mill is a former copper, lead, silver, and zinc mine/mill adjoining Electric Point Mine/Mill in Washington (Derkey et al. 1990; Battien 1998). The mine/mill is reported to have produced from 1901 to 1955 except for 1945 (Derkey et al. 1990). T otal production was 15,583,187 pounds of lead; 9,602 ounces of silver; and 44,681 pounds of zinc (Derkey et al. 1990). T he mine/mill was owned by Gladstone Mining Company who leased the property to other companies and/or private owners

throughout the history of the mine/mill (Battien 1998). Historical ownership information from the time reported to the present is unknown.

6.27.3 Mine/Mill Description/Features

T he Gladstone Mine/Mill is located in the middle dolomite unit of the Metaline Formation. T he ore deposit consists of chimney-type replacements at brecciated intersections of two or more sets of fissures. Most chimneys are 10 to 15 feet in diameter and 100 feet deep. Most of the circular to ellipsoidal chimneys do not extend more than 300 feet from the surface (Derkey et al. 1990). The mine/mill is developed by 4,000 feet of old workings and an 80-foot shaft (Huntting 1956).

6.27.4 START-2 Mine/Mill Visit

On June 21, 2001, the ST ART-2 visited the Gladstone Mine/Mill and conducted a visual inspection of the property and surrounding area (Figure 6-33; Appendix A, Photos 18-16 through 19-11; Appendix B, T eam 1 Phase 1, Pages 16 through 19). T he mine/mill area, which is accessed via a gravel entrance road, contained one waste rock pile measuring 18 feet by 30 feet by 3 feet deep. Shaft 1 located west of the waste rock pile measured 10 feet by 10 feet by unknown depth. Shaft 2 was located approximately 75 feet north of shaft 1and measured 10 feet by 10 feet by unknown depth. Collapsed shaft 3 was located approximately 20 feet east and 30 feet north of shaft 2 and measured 10 feet by 10 feet by unknown depth. Continuing north of shaft 3 for 20 feet shaft 4 was identified and measured 10 feet by 10 feet by unknown depth. West of the gravel entrance road and the shafts, the START -2 identified a tailings pile, a collapsed building potentially a mill, and an ore loading cart. T he tailings pile measured 60 feet by 60 feet by 6 feet deep and was located 30 feet west of the gravel road. T he collapsed building measured 15 feet by 15 feet and was located near the southern portion of the tailings pile. T he ore loading cart measured 10 feet by 10 feet by 20 feet and was located near the northern portion of the tailings pile. No PPEs were identified by the ST ART-2. Access to the mine/mill is unrestricted. T he ST ART -2 noted evidence of past logging on the property. No grazing was noted in the mine/mill area.

6.27.5 Sampling Locations

Sample locations are depicted in Figure 6-34. T hree tailings samples(GLT P01SS

through GLT P03SS) were collected from the tailings pile located in between two buildings. T he samples were collected within the overland surface water drainage routes identified by the ST ART -2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to consist of fine orange-brown sand/silt. No odor was noted during the sample collection.

T hree surface soil samples (GLMS01SS through GLMS03SS) were collected from the potential mill area. T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to consist of medium brown-orange sand with trace gravel. No odor was noted during the sample collection.

6.27.6 Analytical Results

6.27.6.1 Surface Soil Sample Results

T he ST ART -2 collected six surface soil samples for T AL metals analyses: three tailings samples (GLT P01SS through GLT P03SS) and three surface soil samples (GLMS01SS through GLMS03SS) from the potential mill area.

In the tailings samples, significant concentrations of lead ranged from 27,100 mg/kg to 94,000 mg/kg. Significant concentrations of mercury ranged from 0.19 mg/kg to 0.30 mg/kg. Significant concentrations of zinc ranged from 6,560 mg/kg to 10,500 mg/kg.

In surface soil samples collected from the potential mill area, significant concentrations of lead ranged from 20,300 mg/kg to 35,200 mg/kg. Significant concentrations of mercury ranged from
0.20 mg/kg to 0.25 mg/kg. Significant concentrations of zinc ranged from 6,020 mg/kg to 6,790 mg/kg. Refer to T able 6-20 for complete data results.

6.28 LUCKY FO UR MINE

6.28.1 Mine Location

Latitude: 48 52' 51.60"N

Longitude:	117 32' 33.00"W
Legal Description:	Section 18, Township 39N, Range 42E
CERCLIS ID:	WAN001002386
County:	Stevens
Contact:	Colville National Forest 765 South Main Colville, Washington 99114

6.28.2 Historical Information and Mine Description/Features

T he Lucky Four Mine is a former copper, gold, lead, and silver mine situated at the north end of the Fifteen Mile Creek district, Washington. A vein, four and one-half feet in width, trends through the formations. T he ore consists of chalcopyrite, pyrrhotite and pyrite, which yields copper, gold, and silver. It is estimated that 100 tons of ore have been mined and shipped from the Lucky Four Mine. For a distance of over 100 feet along the vein there has been trenching and open cut work. T he property has been developed by two shafts, one to a depth of 27 feet, the other to a depth of 12 feet. (Weaver 1920)

6.28.3 START-2 Mine Visit

On June 22, 2001, the ST ART-2 visited the Lucky Four Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 1 Phase 1, Page 20). T he area consisted of a shaft with a crank or pulling system above it (Appendix A, Photo 19-12 and 19-13). No contaminant source was identified on the property. Access to the mine was unrestricted. No samples were collected at the Lucky Four Mine.

6.29 RED TO P MINE

6.29.1 Mine Location

Latitude: 48- 56' 35.88"N

Longitude: 117- 33' 52.20"W

Legal Description: NE¼ SE¼ Section 25, Township 40N, Range 41E

CERCLIS ID: WAN001002394

County: Stevens

Contact: Mick Vaagen and Trent Lang
Vaagen Brothers Lumber
565 W 5th
Colville, Washington 99114
(509) 684-5071

6.29.2 Historical Information

T he Red T op Mine is a former lead, silver, and zinc mine located in the Northport mining district, Washington (Derkey et al. 1990). The mine is reported to have produced approximately 200 tons of ore prior to 1939 (Derkey et al. 1990). T he mine also is reported to have produced in 1944 and 1953 (Derkey et al. 1990). From 1952 to 1954 the Pacific Northwest Mining Company was listed as the owner (Battien 1998). By 1962, the Red T op Company leased the mine to Rare Metals Corporation (Battien 1998). Historical ownership information from 1962 to the present is unknown.

6.29.3 Mine Description/Features

T he Red T op Mine consists of five patented and three unpatented claims (Huntting 1956). Mineralized shear zones are in marble and argillite and are crisscrossed by quartz veins. Some ore shoots are as much as 4 feet wide and 18 feet long. Four separate mineralized zones, as much as 1 foot wide, cut across bedding. T he ore minerals in these transverse zones include galena, pyrite, scheelite, and tetrahedrite (Derkey et al. 1990). The mine is developed by a 2,700-foot adit and approximately 1,500 feet of drifts and raises (Huntting 1956).

6.29.4 START-2 Mine Visit

On June 26, 2001, the ST ART-2 visited the Red T op Mine and conducted a visual inspection of the property and surrounding area (Figure 6-35; Appendix A, Photos 14-11 through 14-20; Appendix B, T eam 1 Phase 1, Pages 3 through 5). T he mine area, which is accessed via an unimproved road, contained a waste rock pile measuring 200 feet by 150 feet by 10 feet deep. An adit, measuring 5 feet by 5 feet by unknown depth, is located north of the waste rock pile and unimproved road. Wooden debris, measuring 10 feet by 15 feet, was noted west of the waste rock pile and south of the unimproved road. A portal/shaft, measuring 10 feet by 5 feet, is located west of the adit. No discharge was observed from the adit or the portal/shaft. T he ST ART -2 did

not observe an overland drainage route from the waste rock pile to a body of water. No PPEs were identified. Access to the mine was unrestricted. No logging or grazing was noted in the vicinity of the mine.

6.29.5 Sample Locations

Sample locations are depicted in Figure 6-36. Three waste rock samples (RDWP01SS through RDWP03SS) were collected from the waste rock pile located south of the portal/shaft. The samples were collected to determine potential contamination associated with this source. The samples appeared to consist of light brown fine sand with trace gravel. No odor or staining was noted during the sample collection.

6.29.6 Analytical Results

6.29.6.1 Surface Soil Sample Results

The START-2 collected three surface soil samples from waste rock for TAL metals analyses. Significant concentrations of cadmium ranged from 111 mg/kg to 177 mg/kg. Significant concentrations of copper ranged from 225 mg/kg to 1,080 mg/kg. Significant concentrations of lead ranged from 14,600 mg/kg to 28,900 mg/kg. Significant concentrations of mercury ranged from 0.40 mg/kg to

1. 1.1 mg/kg. Significant concentrations of zinc ranged from 10,700 mg/kg to 15,700 mg/kg. Refer to Table 6-21 for complete data results.
2. **6.30 ANDERSON CALHOUN MINE/MILL**

6.30.1 Mine/Mill Location

Latitude:	48 55' 09.84"N
Longitude:	117-35' 28.68"W
Legal Description:	NW¼ Section 2, Township 39N, Range 41E
CERCLIS ID:	WAN001002309
County:	Stevens
Contact:	Lloyd Nickels Stevens County Public Utilities P.O. Box 390 Colville, Washington 99114 (509) 684-7500

6.30.2 Historical Information

T he Anderson Calhoun Mine/Mill is a former lead and zinc mine/mill located one mile north of Leadpoint, Washington (Derkey et al. 1990). T he mine is reported to have produced between 1948 and 1952 (Derkey et al. 1990). The first claims were documented in 1937 (Battien 1998). T otal production at the end of 1951 was approximately 100,000 tons (Derkey et al. 1990).

Andy Anderson discovered mineralization in 1910 and explored it with shallow pits and trenches (Mills 1977). During World War II, the United States Bureau of Mines drilled several holes as part of the Defense Minerals Program (Mills 1977). Goldfield Consolidated acquired the mine/mill, the date unknown, and mined by open-pit the area prospected by Anderson, drilled out a portion of the ore body adjacent to the pit, and initiated mechanized development (Mills 1977). American Zinc Lead and Smelting Company purchased the mine/mill from Goldfield Consolidated in 1964 and entered into production in 1966 (Battien 1998; Mills 1977). By 1965-1966, a 1,200 ton floatation mill for lead, silver, and zinc had been built (Battien 1998). In addition to the floatation mill, another mill, shops, and warehouses were constructed (Battien 1998). The mine/mill operated until 1968 (Derkey et al. 1990). T he mine/mill closed because of depressed metal prices and diminishing ore reserves after extraction of nearly a million tons of ore (Mills 1977). Historical ownership information from 1968 to the present is unknown.

6.30.3 Mine/Mill Description/Features

T he Anderson Calhoun Mine/Mill is situated on the west side of Deep Creek approximately 1 mile north of Leadpoint. T he mine/mill lies in the middle dolomite unit of the Metaline Formation. Ore minerals occur disseminated in limestone. The ore bodies range up to 80 feet wide, 80 feet high, and 650 feet long (Derkey et al. 1990). Production is from open pit mining. (Huntting 1956)

6.30.4 START-2 Mine/Mill Visit

On September 11 and 13, 2001, the START-2 visited the Anderson Calhoun Mine/Mill and conducted a visual inspection of the property and surrounding area (Figure 6-37; Appendix A, Photos 35-1 through 38-10, 44-15 through 46-3, 46-11 through 46-12; Appendix B, T eam 2 Phase 2. Pages 14 through 19, 22 and T eam 1 Phase 2, Page 10). T he mine/mill area consisted

of a tailings pile measuring 555 feet by 500 feet by unknown depth. T he tailings pile was located adjacent to the gated entrance road and on the western portion of the property. The START -2 noted 4 x 4 vehicle and bicycle tracks on the tailings. A pond is located on the tailings pile and sporadic vegetation also was noted on the tailings. T o the north of the tailings pile, an evaporation pond was noted measuring 105 feet by 50 feet. A pipe was protruding from the southern portion of the evaporation pond into the pond. No liner was present and the vegetation surrounding the evaporation pond was stressed.

T o the east of the tailings pile a waste rock pile was located underneath the waste rock conveyor belt measuring 120 feet by 80 feet by 20 feet deep. T he waste rock conveyor belt was connected to the mine building, the floatation building, and the waste rock storage bin. T he mine building measured 25 feet in width by 15 feet in length by 20 feet in height. T he conveyor belt attached to the floatation building measured 35 feet in length. T he floatation building measured 25 feet in width by 15 feet in length by 10 feet in height. T he waste rock storage bin measured 15 feet in width by 15 feet in length by 40 feet in height.

T he mill building was located north of the mine building and measured 50 feet in widt h by 75 feet in lengt h by 40 feet in height. T he mill building contained staged reagent and unknown drums, floatation tanks, and a crusher. Approximately 100 55-gallon steel drums were staged in the east corner of t he mill building. Many of t hese unmarked drums were punctured with bullet s wit h the cont ent s spilling onto t he concrete foundat ion. T he unknown spilled contents were solidified. T he concret e floor did not appear to be breached. T ailings were scatt ered throughout t he mill building. A portal measuring 10 feet by 10 feet was locat ed on t he western port ion of the mill building with a conveyor belt leading into t he building.

A first aid room of wood construction was located southwest of t he mill building and adjacent to the conveyor belt extending from the portal/shaft. T he first aid room measured 8 feet in width by 10 feet in length by 12 feet in height. T he conveyor belt extending from the portal/shaft appeared to connect with the mine building at one point, measuring approximately 110 feet in length.

Remnants of a storage shed and two concrete pads were located between the mine and mill buildings. T he storage shed foundation measured 20 feet by 20 feet. Remnants of " Cebar Barite", a white cellulose-type material, was scattered throughout the storage shed foundation and surrounding area including the concrete pads. Five 55-gallon drums were scattered on the storage shed foundation. One concrete pad measuring 40 feet by 10 feet was located directly east of the dilapidated storage shed. T en 55-gallon drums were staged on palettes. T here was

no legible documentation on the drums. T he second concrete pad was located north of the first concrete pad and measured 10 feet by 20 feet. Scrap wood, steel, and garbage were scattered on both concrete pads.

On the north side of t he mill building, t hree areas of scatt ered drums intermixed with debris and equipment were documented. Stained soil with an oil odor were noted around the drums. Cattle prints were identified in the stained soil. T here was a distinct sheen throughout the stained soil area surrounding the drums.

T ransformers were identified in 6 areas. A substation, heavily vandalized, also was documented. T he first area was located east of the dilapidated storage shed and two concrete pads and included a power line with three transformers. T he second area was located adjacent to the south side of the mill building and consisted of three transformers staged on concrete pads. T he concrete was not compromised. T he third area was located west of the second area and consisted of a fallen power line with a transformer. T he top of the transformer was detached and no staining was noted in the vicinity. T he fourth area was located north of the fallen power line and consisted of a gated area containing a power line with transformer and 6 transformers staged on concrete. No staining was noted on the concrete or the surrounding soil. T he fifth area was located west of the fourth area and consisted of three transformers staged on a concrete pad. No staining was noted on the concrete or the surrounding soil. T he sixth area was located to the east of the fourth area and consisted of a power line with a transformer. T he substation was located south of the sixth area and east of the third area and consisted of a partially gated area with remnant electrical equipment.

On the southern portion of the property and east of the mine/mill entrance, a silo, concrete pad, and mine pit were located. T he mine pit measured approximately 100 feet by 50 feet by unknown depth and was filled with water.

A stream flowing south extended the entire length of the mine/mill and onto private farmland. A marshy wetland area was noted on the western portion of the stream and adjacent to the eastern side of the tailings pile and evaporation pond (PPE 1).

Access to the mine/mill is restricted with a locked gate. Pastures are located adjacent to the mine/mill on the northern and southern portions. Numerous animal tracks were noted throughout the property, concentrated in the tailings pile and the stained soil areas. No logging was noted in the vicinity of the property.

6.30.5 Sampling Locations

Sample locations are depicted in Figure 6-38. Six tailings samples were collected from the two tailings pile areas: three surface soil samples from the northern portion of the tailings pile (ANT P01SS through ANT P03SS) and three sediment samples from within the pond located on top of the tailings pile on the southern portion of the pile (ANT P04SD through ANT P06SD). The samples were collected within the overland surface water drainage routes identified by the START-2. The samples were collected to determine potential contamination associated with this source. ANT P01SS through ANT P03SS appeared to consist of gray silt. ANT P04SD through ANT P06SD appeared to consist of dark brown to black silt. No odor or staining was noted during sample collection.

Four surface soil samples (ANSS01SS through ANSS04SS) were collected from areas of stained soil at the mine/mill. The samples appeared to consist of stained black soil with sand and gravel. An oily odor and staining were noted during sample collection. ANSS01SS and ANSS02SS were collected from the dilapidated storage shed area. ANSS03SS and ANSS04SS were collected from the stained soil area located on the northern portion of the mill building.

One surface water sample (ANAD01SW) was collected from the mine pit water located on the southern portion of the property. The sample was collected within the overland surface water drainage route identified by the START-2. The sample was collected to determine potential contamination associated with this source. The sample was clear and blue-green in color. No odor or staining was noted during sample collection.

A sediment sample (ANPP01SD) was collected at the confluence of the breach of the tailings pile to the wetlands on the unnamed stream (PPE 1). The sample appeared to consist of silt and sand. The sample was black and had an organic odor.

6.30.6 Analytical Results

6.30.6.1 Surface Soil Sample Results

The START-2 collected 7 surface soil samples at the Anderson Calhoun Mine/Mill for TAL metals analyses: three from the tailings pile (ANT P01SS through ANT P03SS) and four from areas of stained soil (ANSS01SS through ANSS04SS).

In the tailings samples, significant concentrations of copper ranged from 39.2 mg/kg to 55.0 mg/kg. Significant concentrations of mercury ranged from 0.12 mg/kg to 0.19 mg/kg.

In surface soil samples collected from areas of stained soil, significant concentrations of cadmium ranged from 124 mg/kg to 129 mg/kg. Significant

concentrations of copper ranged from
73.8 mg/kg to 115 mg/kg. Significant concentrations of lead ranged from 2,130 mg/kg to 2,190 mg/kg. Significant concentrations of mercury ranged from 0.18 mg/kg to 0.35 mg/kg. Significant concentrations of zinc ranged from 44,900 mg/kg to 49,000 mg/kg. Refer to Table 6-22 for complete data results.

Four surface soil samples collected at the Anderson Calhoun Mine/Mill also were analyzed for pesticides//PCBs. No significant concentrations were detected.

6.30.6.2 Surface Water Sample Results

The surface water sample collected from the mine pit water (ANAD01SW) contained lead at 192 .g/L and zinc at 1,480 .g/L.

6.30.6.3 Sediment Sample Results

The START-2 collected 4 sediment samples at the Anderson Calhoun Mine/Mill for TAL metals analyses. The three sediment samples collected from the pond on top of the tailings pile (ANTP04SD, ANTP05SD, and ANTP06SD) contained significant concentrations of arsenic ranging from 4.3 mg/kg to
10.0 mg/kg, cadmium from 4.7 mg/kg to 7.5 mg/kg, copper from 30.7 mg/kg to 67.4 mg/kg, lead from 317 mg/kg to 320 mg/kg, mercury at a significant concentration of 0.17 mg/kg, and zinc at significant concentrations ranging from 723 mg/kg to 3,250 mg/kg for zinc. The sediment sample collected at PPE 1 (ANPP01SD) contained elevated concentrations of copper at 23.2 mg/kg and zinc at 343 mg/kg. Refer to Table 6-23 for complete data results.

6.3 LUCILE MINE

1

6.31.1 Mine Location

Latitude:	48 57' 01.08"N
Longitude:	117 33' 12.24"W
Legal Description:	Section 30, Township 40N, Range 42E
CERCLIS ID:	WAN001002385
County:	Stevens
Contact:	Colville National Forest 765 South Main Colville, Washington 99114

6.31.2 Historical Information and Mine Description/Features

T he Lucile Mine is a former cadmium, lead, silver, and zinc mine located on the eastern slope of the Red Top Mountain in the Northport mining district, Washington. Alternate names include Owen Mine and Boundary Silver Lead Mine. The mine was reported to have produced 50 tons of ore in 1926, 160 tons in 1948, and 44 tons in 1949 (Huntting 1956). T he mine reportedly operated from 1910 to the late 1940s. T he ore deposit consists of irregular mineralized zones in marble associated with quartz veins and lamprophyre dikes (Huntting 1956). Values are in cadmium, lead, silver, and zinc with zinc of high quality (Battien 1998).

6.31.3 START-2 Mine Visit

On June 22, 2001, the ST ART-2 visited the Lucile Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 3 Phase 1, Pages 15 and 16). The mine was accessed
from Forest Service Road 915. T he area consisted of a waste rock pile, a collapsed adit, and wood debris (Appendix A, Photos 12-1, 12-2 and 12-3). The adit was not flowing at the time of the visit. T he waste rock pile measured approximately 500 feet tall by 75 feet by 5 feet deep and was located about 40 feet from the collapsed adit. T he ST ART - 2 did not observe any overland drainage routes from the waste rock pile or adit to surface water. No residents or potential receptors were observed on the property. No samples were collected at the Lucile Mine.

6.32 IROQUOIS MINE

6.32.1 Mine Location

Latitude: 48- 57' 06.12"N

Longitude: 117- 32' 22.92"W

Legal Description: SW¼ Section 30, Township 40N, Range 42E

CERCLIS ID: WAN001002381

County: Stevens

Contact: William Green

Riverside #311
Spokane,
Washington
99201 (509)
838-6050

6.32.2 Historical Information

T he Iroquois Mine is a former cadmium, lead, silver, and zinc mine (Derkey et al. 1990). The mine is 8 miles southeast of Boundary and approximately 4 miles by road to Leadpoint, Washington (Battien 1998). T he mine is reported to have produced in 1917, 1928, and 1950 (Derkey et al. 1990). Mines Management, Inc., of Spokane was owner of the mine and its 17 unpatented claims and 40 acres of deeded ground in the 1950s (Battien 1998). In 1964 the Bunker Hill Company took a lease on the mine (Battien 1998). Historical ownership from 1964 to the present is unknown.

6.32.3 Mine Description/Features

T he Iroquois Mine is situated about 8 miles southeast of Boundary, Washington. T he property consists of three claims and 120 acres of incorporated land. It was formerly known as the Flannigan Mine (Weaver 1920). The property is developed by a main lower tunnel driven for a distance of 430 feet. About 290 feet in elevation above the lower tunnel there is an older, upper tunnel driven for 111 feet. Approximately 175 feet south of the upper tunnel there is an old glory hole where considerable galena and lead carbonate ore have been mined. T he formation in which the ores occur is a blue to grayish massive limest one, crushed and fault ed and cut by numerous dikes, varying from 2 t o 10 inches in width. In the lower t unnel sphalerit e was observed in the limestone near the argillite cont act. (Weaver 1920)

6.32.4 START-2 Mine Visit

On June 22, 2001, the ST ART-2 visited the Iroquois Mine and conducted a visual inspection of the property and surrounding area (Figure 6-39; Appendix A, Photos 12-5 through 12-17; Appendix B, T eam 3 Phase 1, Pages 16 through 18). T he mine area consisted of one waste rock pile measuring 170 feet by 40 feet by 4 feet deep located on the northern portion of the property and northwest of the unnamed road. South of the unnamed road, the ST ART-2 identified an adit, three buildings, a pile of

wood, and a piece of rail line. T he adit measured 3 feet by 5 feet by unknown depth. Adit discharge flowed northwest in two directions. One path was south through a pipe under the road, around and past the waste rock pile where it pooled and infiltrated the ground. T he second path was over the road into the waste rock pile. Building 1 measured 10 feet by 15 feet and was located west of the adit. Building 2 measured 20 feet by 50 feet and was located northeast of the adit. Building 3 measured 5 feet by 8 feet and was located 42 feet northeast of building 2. A pile of untreated timber was located between building 1 and the adit. A loose piece of rail line was located northwest of building 2. No PPEs were identified by the ST ART-2. Access to the mine is unrestricted. Logging occurs in the vicinity of the mine. No grazing was observed by the ST ART-2.

6.32.5 Sampling Locations

Sample locations are depicted in Figure 6-40. T wo waste rock samples (IRWP01SS and IRWP02SS) were collected from the waste rock pile. T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to consist of dark gray sandy gravel. No odor or staining was noted during sample collection.

T wo surface water samples (IRAD01SW and IRAD02SW) were collected from the adit located on the property. IRAD01SW was collected near the mouth of the adit. IRAD02SW was collected at the confluence of the adit discharge and the waste rock pile. T he samples were collected within the overland surface water drainage routes identified by the ST ART-2. T he samples were collected to determine potential contamination associated with this source. T he samples appeared to be clear. No odor or staining was noted during sample collection.

6.32.6 Analytical Results

6.32.6.1 Surface Soil Sample Results

T he ST ART -2 collected two surface soil samples from waste rock for T AL metals analyses. Significant concentrations of cadmium ranged from 33.2 mg/kg to 39.1 mg/kg. Significant concentrations of mercury ranged from 0.25 mg/kg to 0.49 mg/kg. Significant concentrations of zinc ranged from 10,000 mg/kg to 12,300 mg/kg.

Refer to T able 6-24 for complete data results.

6.32.6.2 Surface Water Sample Results

Analytes detected in surface water samples collected from adit water include zinc at an estimated concentration of 583 .g/L.

6.33 SILVER Q UEEN MINE

6.33.1 Mine Location

Latitude: 48- 32' 56.90"N

Longitude: 118- 06' 57.60"W

Legal Description: NE¼ SW¼ Section 11, T ownship 35N, Range 37E

CERCLIS ID: WAN001002397

County: Stevens

Contact: United States Department of the Interior

Bureau of Land Management

Spokane District Office

1103 N. Fancher

Spokane, Washington 99212-1275

(509) 536-1200

6.33.2 Historical Information

T he Silver Queen Mine is a former lead, silver, and zinc mine located in the Deer T rail district, Washington. T he mine is reported to have produced in 1917, 1928, 1937, 1938, and 1940 (Huntting 1956). Prior owners of the claim are reported to be Silver Basin Mining Company (1902-1924), Seal & Queen Consolidated Mining Company (1907), Commodore Mines Corporation (1928-1931), Silver Glance Mines Development Company (1929), Silver Seal Mining Company (1931), Queen & Seel Mining Company (1935-1939), and J. G. Glasgow (1941) (Huntting 1956). Further ownership history from 1941 to the present is unknown.

6.33.3 Mine Description/Features

T he Silver Queen Mine is located on the opposite side of a sharp ridge on the Springdale road, at an elevation of 3,800 feet. T he ore consists of white quartz, often iron stained, carrying as its chief value silver in the forms of argentite and chloride, together with subordinate amounts of galena, pyrite, and sphalerite. T he ore occurs in shoots having a predominating pitch to the northeast. T he country rock is a light colored crystalline dolomite limestone, in places brecciated and silicified. Within one-fourth mile both east and west of the property are exposures of intrusive granite. (Jenkins 1924)

6.33.4 START-2 Mine Visit

On September 11, 2001, the ST ART-2 visited the Silver Queen Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 2 Phase 2, Pages 8 through 12). T he property is situated on the side of a mountain with an upper slope, middle slope, and lower slope. T he upper slope consisted of four shed-like buildings, an adit, and a power pole (Appendix A, Photos 44-1, 44-2, 44-3, and 44-12). Approximately 4 inches of ponded water was observed in the adit. T he adit was not flowing at the time of the visit and sand bags were observed at the opening of the adit (Appendix A, Photos 44-4 and 44-11). T he area in front of the adit was wet with shallow ponded water for approximately 10 feet. T he middle slope consisted of a mill, a collapsed building, tailings, and a waste rock pile (Appendix A, Photos 44-5 through 44-8, 44-10 and 44-14). T he mill building measured 15 feet by 15 feet by 25 feet. T he tailings at the middle slope were observed to be very fine and silty. T he lower slope consisted of finer tailings. T he tailings measured 60 feet by 45 feet by unknown depth. At the bottom of the lower slope, the road slopes downward to a point where most run-off from the mine property would flow. At this location is a pump shed with four round concrete structures (Appendix A, Photo 44-13). T he ST ART-2 did not observe any overland drainage routes from the adit, tailings, or waste rock pile to surface water. Access to the mine was unrestricted. No residents or potential receptors were observed on the property. No samples were collected at the Silver Queen Mine.

6.34 MELRO SE MINE

6.34.1 Mine Location

Latitude: 48- 56' 44.52"N

Longitude: 117-38' 45.96"W

Legal Description: SW¼ NW¼ Section 28, T ownship 40N, Range 41E

CERCLIS ID: WAN001002389

County: Stevens

Contact: Mick Vaagen and Trent Lang

Vaagen Brothers Lumber 565 W 5th Colville, Washington 99114 (509) 684-5071

6.34.2 Historical Information

T he Melrose Mine is a former copper, lead, silver, and zinc mine located 4 miles south of Boundary, Washington (Derkey et al. 1990). T he mine is reported to have produced between 1913 and 1938 (Derkey et al. 1990). The total yield from 97 tons of ore was 1,255 pounds of copper, 11,176 pounds of lead, and 2,973 ounces of silver (Derkey et al. 1990). Charleston Resources Ltd. took over the property in 1977 (Battien 1998). Historical ownership information from 1977 to the present is unknown.

6.34.3 Mine Description/Features

T he Melrose Mine ore deposit consists of a 6-foot vein in argillite containing irregular scattered bunches of ore. Ore minerals include galena, sphalerite, and tetrahedrite. T he mine is developed by 1,600 feet of underground workings. (Huntting 1956)

6.34.4 START-2 Mine Visit

On June 18, 2001, the ST ART-2 visited the Melrose Mine and conducted a visual inspection of the property and surrounding area (Figure 6-41; Appendix A, Photos 14-1 through 14-7; Appendix B, T eam 1 Phase 1, Pages 2 and 3). T he mine area consisted of an adit 5 feet by 10 feet by unknown depth. Moss and algae growth were noted near the mouth of the adit. T he adit discharge flowed approximately 40 feet east to an unnamed tributary (PPE 1) that feeds into T om Bush Creek. The START -2 estimated the flow of the unnamed tributary at 1 gpm. T here were no waste rock piles; however, the entry road appeared to be constructed out of waste rock. A building approximately 10 feet by 10 feet by 10 feet was

located to the north of the adit and contained test core samples. Access to the mine was unrestricted and the ST ART-2 noted garbage left by visitors. No logging or grazing was noted in the vicinity of the mine.

6.34.5 Sample Locations

Sample locations are depicted in Figure 6-42. One surface water sample was collected from the discharge of water originating at the adit (MLAD01SW). The sample was collected within the overland surface water drainage route identified by the START-2. The sample was collected to determine potential contamination associated with this source. The sample was clear. No odor or staining was noted during sample collection.

One sediment sample was collected at the confluence of the adit water drainage to the unnamed tributary (PPE-1; MLPP01SD). The sample appeared to consist of brown sand with trave gravel and organics. No odor or staining was noted during sample collection.

6.34.6 Analytical Results

6.34.6.1 Surface Water Sample Results

Analytes detected in water collected at the adit include zinc at an estimated concentration of 433 .g/L.

6.34.6.2 Sediment Sample Results

The START-2 collected one sediment sample from the PPE for TAL metals analyses. Cadmium was detected at an elevated concentration of 22.8 mg/kg and zinc was detected at an elevated concentration of 1,650 mg/kg. Refer to Table 6-25 for complete data results.

6.3 LAKEVIEW MINE 5

6.35.1 Mine Location

Latitude:	48 57' 51.84"W
Longitude:	117 32' 57.12"N
Legal Description:	Near center Section 19, Township 40N, Range 42E
CERCLIS ID:	WAN001002383
County:	Stevens
Contact:	Colville National Forest 765 South Main Colville, Washington 99114

6.35.2 Historical Information and Mine Description/Features

T he Lakeview Mine is a former lead and silver mine located in the Northport mining district on the north side of Red T op Mountain, Washington. An alternate name is Hazel Mine. T he property reportedly consists of six claims. T he ore deposit consists of quartz containing a little galena and some silver sulphides. T iny crystals of pyromorphite were also found in the oxidized portion of the ores. T he ore value consists largely of silver (Jenkins 1924).

6.35.3 START-2 Mine Visit

On June 19. 2001, the ST ART -2 visited the Lakeview Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 3 Phase 1, Pages 9 and 10). T he area was heavily forested with no signs or visible remnants of mining activity (Appendix A, Photo 10-15). Approximately a quarter mile north of the mine location an area was observed to be heavily logged and clear cut. T he ST ART-2 did not observe any contaminant source at the property. Access to the mine was unrestricted. No samples were collected at the Lakeview Mine.

6.3 JACKSO N MINE
6

6.36.1 Mine Location

Latitude:	48 57' 35.64"N
Longitude:	117 34' 08.04"W
Legal Description:	SW¼ NW¼ Section 24, T ownship 40N, Range 41E
CERCLIS ID:	WAN001002382
County:	Stevens
Contact:	Ron Matney 145 Highway 20 East Colville, Washington 99114

6.36.2 Historical Information and Mine Description/Features

T he Jackson Mine is a former copper, lead, silver, and zinc mine located in the Northport mining district, Washington. T he mine reportedly yielded 7 tons of ore (Derkey et al. 1990). T he ore deposit is described as a mineralized quartz vein in

argillite 4 to 6 feet in width (Huntting 1956).

6.36.3 START-2 Mine Visit

On June 25, 2001, the ST ART -2 visited the Jackson Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 3 Phase 1. Pages 24 and 25). T he ST ART-2 was accompanied by Ron Matney, the property owner. T he area consisted of an adit and a cabin (Appendix A, Photos 13-1, 13-2, and 13-3). T he adit was not flowing at the time of the visit. T he area surrounding the mine was partially logged. T he ST ART-2 did not observe any overland drainage route from the adit to surface water. Access to the mine was unrestricted. No residents or potential receptors were observed on the property. No samples were collected at the Jackson Mine.

6.37 FRISCO -STANDARD MINE

6.37.1 Mine Location

Latitude: 48- 59' 34.80"W

Longitude: 117- 26' 39.48"N

Legal Description: S½ NW¼ Section 12, T ownship 40N, Range 42E

CERCLIS ID: WAN001002375

County: Stevens

Contact: Charles Shaw

8 B Eagles Nest
Drive LaConnor,
Washington
98257

6.37.2 Historical Information

T he Frisco-Standard Mine is a former copper, lead, and silver mine located in the Northport mining district, Washington (Huntting 1956). T he property consists of seven patented claims (Jenkins 1924). Several buildings, including a cookhouse, cabin, and a mill, were to be listed as holdings of Frisco-Standard (Battien 1998). In 1943, the mine was operated by the Northport Mining and Development Company, Inc. A 1965 report states that intermittent exploration had been carried out by several different lessees, with most values in lead, silver, and copper (Battien 1998). T he property is currently owned

by Charles Shaw (Appendix B, T eam 3 Phase 1, Page 8).

6.37.3 Mine Description/Features

T he Frisco-Standard Mine is located on Jubilee Creek, just south of the U.S.-Canada border (Derkey et al. 1990). T he formation exposed is termed the Fish Creek argillite, and is of probable Palaeozoic age. A grayish calcareous argillite and a black carbonaceous argillite are the predominating varieties of rock exposed (Weaver 1920). T he ore deposit consists of quartz veins or lenses up to 7 feet wide in sheared graphitic schist (Huntting 1956).

6.37.4 START-2 Mine Visit

On June 19, 2001, the ST ART -2 visited the Frisco-Standard Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 3 Phase 1, Pages 8 and 10). T he ST ART -2 observed a waste rock pile, two adits, and one possible exploratory adit (Appendix A, Photos 10-3 through 10-7). None of the adits were flowing at the time of the visit. T he waste rock pile measured approximately 3 feet deep by 25 feet wide by 63 feet in height. T he ST ART -2 did not observe any overland drainage routes from the waste rock pile to surface water. Access to the mine was unrestricted. No residents or potential receptors were observed on the property. No samples were collected at the Frisco-Standard Mine.

6.3 MYEERAH MINE
8

6.38.1 Mine Location

Latitude:	48 59' 26.16"N
Longitude:	117 27' 14.76"W
Legal Description:	E center Section 11, T ownship 40N, Range 42E
CERCLIS ID:	WAN001002390
County:	Stevens
Contact:	Colville National Forest 765 South Main

Colville, Washington 99114

6.38.2 Historical Information and Mine Description/Features

T he Myeerah Mine is a former gold, lead, silver, and zinc mine located in the Northport mining district, Washington. T he mine is reported to have produced in 1926 and 1942. Yield from 21 tons of ore was 8,175 pounds lead and 288 ounces silver (Derkey et al. 1990). T he ore deposit is a 2-foot wide vein consisting of quartz, sheared slate, and numerous lamprophyre dikes. T he vein is reported to be traceable for about 1,000 feet. T he mine is developed by adits and numerous open cuts. (Huntting 1956)

6.38.3 START-2 Mine Visit

On June 19, 2001, the ST ART-2 visited the Myeerah Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 3 Phase 1, Pages 8 through 10). T he mine area consisted of a dilapidated metal shed with a collapsed adit inside, and two waste rock piles (Appendix A, Photos 10-8 through 10-12). T he collapsed adit was not flowing at the time of the visit. One waste rock pile located north and across the road from the dilapidated shed measured 2 feet deep by 20 feet wide by 20 feet in height. T he second waste rock pile measuring 10 feet by 10 feet by 2 feet deep was located west of the dilapidated shed (Appendix A, Photo 10-12). Signs posted on the shed included "Danger Forest Service abandoned mine hazard: sign P61-23"; " Keep out Pure Luck Mining Claim"; and " Work-current, August 1992, August 1996, August 1997". T he ST ART -2 did not observe any overland drainage routes from the adit or waste rock piles to surface water. Access to the shed and adit was restricted by a locked metal door. No residents or potential receptors were observed on the property. No samples were collected at the Myeerah Mine.

6.39 UNITED TREASURE MINE

6.39.1 Mine Location

Latitude:	48 59' 21.48"N
Longitude:	117 27' 51.12"W
Legal Description:	Near center Section 11, T ownship 40N, Range 42E
CERCLIS ID:	WAN001002399
County:	Stevens
Contact:	Colville National Forest 765 South Main Colville, Washington 99114

6.39.2 Historical Information

T he United T reasure Mine is a former copper, gold, lead, silver, and zinc mine located in the Northport mining district, Washington (Weaver 1920). T he mine was reported to have produced 62 tons of ore in 1917, 2 tons in 1933, and some production in 1953 (Huntting 1956). Considerable high-grade ore, more or less oxidized, was mined and shipped and packed out by horses to the railroad at Boundary, Washington (Weaver 1920). Still making shipments in 1933, and up to 1953, the United T reasure Mine was owned by Singlejack Silver Mining Exploration Company (Battien 1998). Additional historical ownership information is unknown.

6.39.3 Mine Description/Features

T he United T reasure Mine is situated on the east side of Fish Creek (Huntting 1956). T he formation exposed is a very dark-colored silicified carbonaceous argillite which has been greatly broken by fractures and cross fractures. T he vein is composed of a quartz gangue containing copper, lead, and zinc minerals carrying silver. T he mineralized zone varies in thickness from a few inches to 30 inches (Weaver 1920).

6.39.4 START-2 Mine Visit

On June 20, 2001, the ST ART-2 visited the United T reasure Mine and conducted a visual inspection of the property and surrounding area (Appendix B, T eam 3 Phase 1, Pages 12 and 13). T he mine area consisted of three adits and a waste rock pile (Appendix A, Photos 10-23 and 10-24). T he adits were not flowing at the time of the visit. T he adit openings measured 8 feet by 6 feet, 7 feet by 4 feet, and 5 feet by 2 feet, respectively. T he waste rock pile measured approximately 2 feet long by 5 feet wide by 1 foot deep. T he ST ART-2 did not observe any overland drainage routes from the adits or waste rock pile to surface water. Access to the mine was unrestricted. No residents or potential receptors were observed on the property. No samples were collected at the United T reasure Mine.

Table 6-1

DAISY MINE
SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS
PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS
STEVENS COUNTY, WASHINGTON

EPA Sample ID	01374163	01374164	01374165	01374166
CLP Inorganic ID	MJ0KH2	MJ0KH3	MJ0KH4	MJ0KH5
CLP Organic ID	NU	NU	NU	NU
E & E Sample ID	NU	NU	NU	NU
Station Location	DTBK01SS	DTTP01SS	DTTP02SS	DTTP03SS
Sample Depth (inches)	0-6	0-6	0-6	0-6
Description	Background	Tailings Pile		
TAL Metals (mg/kg)				
Aluminum	18100	3370	8130	4700
Arsenic	68.2	64.3	233	20.4
Barium	168	70.4	34.6 JB	73.5
Beryllium	0.89 JB (1.06 SQL)	1.1	1.2	0.30 JB
Cadmium	4.8	7.8	9.7	0.52 JB
Calcium	5420	245000	38400	7950
Chromium	13.9	6.4	19.1	12.0
Cobalt	14.7	9.4 JB	12.5	4.3 JB
Copper	55.2	137	121	19.6
Iron	25200	23900	30500	12500
Lead	183	70.9	69.3	12.1
Magnesium	4110	6040	7710	2840
Manganese	1070	360	655	236
Mercury	0.06 JB (0.11 SQL)	0.42	2.9	0.05 U
Nickel	16.1	23.5	67.0	20.2
Potassium	1300 JK	1230 JK	1820 JK	1180 JK
Selenium	1.5 JL	3.0 JL	5.9 JL	0.68 UJL
Silver	6.7	2.3	4.6	0.94 JB
Vanadium	41.9	16.3	87.5	35.3
Zinc	462	649	990	76.1

Note. Bold type indicates sample concentration is above the detection limit.
Underlined type indicates the sample results is significant as defined in Section 5.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
BK = Background.
CLP = Contract Laboratory Program.
DT = Daisy Mine.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.

mg/kg = Milligrams per kilogram.
NU = Not utilized.
SQL = Sample quantitation limit.
SS = Surface soil.
TAL = Target Analyte List.
TP = Tailings pile.
U = The analyte was not detected. The associated numerical value is the contract required detection limit.

UPPER COLUMBIA RIVER MINES AND MILLS STEVENS COUNTY, WASHINGTON Table 6-2 DAISY MINE SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS

EPA Sample ID		**01374161**
CLP Inorganic ID		**MJ0KH0**
CLP Organic ID		**J0KH0**
E & E Sample ID		**01090426**
Station Location		**DTPP01SD**
Sample Depth (inches)		**0-6**
Description	**Background**	**PPE 1**
TAL Metals (mg/kg)		
Aluminum	**20200**	**11100**
Arsenic	**13.0**	**17.8**
Barium	**450**	**181**
Cadmium	**3.4**	0.35 JB
Calcium	**109000**	**5490**
Chromium	**32.3**	**14.0**
Cobalt	**11.9**	5.7 JB
Copper	**69.3**	**21.6**
Iron	**27900**	**14700**
Lead	**124**	**17.0**
Magnesium	**33500**	**3220**
Manganese	**673**	**352**
Nickel	**31.9**	**20.9**
Potassium	**3920 JK**	**2550 JK**
Vanadium	**47.4**	**42.5**
Zinc	**239**	**105**
Pesticide/PCBs (mg/kg)		
Endrin Ketone	**4.0**	3.4 U

Note: Bold type indicates sample concentration is above the detection limit.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
CLP = Contract Laboratory Program.
DT = Daisy Mine.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.

J = The analyte was positively identified. The associated numerical value is an estimate.

K = Unknown bias.

mg/kg = Milligrams per kilogram.

µg/kg = Micrograms per kilogram.

PCBs = Polychlorinated biphenyls.

PPE = Probable point of entry.

SD = Sediment.

TAL = Target Analyte List.

U = The analyte was not detected. The associated numerical value is the contract required detection limit.

Table 6-3 L-BAR/NORTHWEST MAGNESITE SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	**01374104**	**01374103**	**01374102**
CLP Inorganic ID	**MJ0KC4**	**MJ0KC3**	**MJ0KC2**
CLP Organic ID	**J0KC4**	**J0KC3**	**J0CK2**
E & E Sample ID	**01090404**	**01090403**	**01090402**
Station Location	**LBBK01SD**	**LBDT03SD**	**LBDT02SD**
Sample Depth (inches)	**0-8**	**0-8**	**0-8**
Description	**Background**	**PPE 1**	**PPE 2**
TAL Metals (mg/kg)			
Aluminum	**20200**	**16600 JK**	**19100 JK**
Arsenic	**12.1**	7.0 JB	11.2 JB
Barium	**450**	164 JB	195 JB
Cadmium	**3.4**	0.71 UJK	1.3 JB
Calcium	**39600**	**6330 JK**	**16000 JK**
Chromium	**32.3**	**21.4 JK**	**28.1 JK**
Cobalt	**11.9**	7.6 JB	9.7 JB
Copper	**69.3**	**45.3 JK**	**62.1 JK**
Iron	**27900**	**19600 JK**	**23600 JK**
Lead	**124**	**43.1 JK**	**49.4 JK**
Magnesium	**33500**	**22900 JK**	**38400 JK**
Manganese	**673**	**310 JK**	**784 JK**
Mercury	0.10 JB (0.10 SQL)	R	R
Nickel	**31.9**	21.9 JB	26.3 JB
Potassium	**3920 JK**	**27900 JK**	**31600 JK**
Selenium	0.7 UJK	**18.0 JK**	**15.9 JK**
Vanadium	**47.4**	29.4 JB	32.3 JB
Zinc	**239**	**140**	**218 JK**

Note: Bold type indicates sample concentration is above the detection limit.

Underlined type indicates the sample results is significant as defined in Section 5.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.

BK = Background.

CLP = Contract Laboratory Program.

DT = Ditch.

E & E = Ecology and Environment, Inc.

EPA = United States Environmental Protection Agency.

ID = Identification.

J = The analyte was positively identified. The associated numerical value is an estimate.

K = Unknown bias.

LB = L-Bar/Northwest Magnesite.

mg/kg = Milligrams per kilogram.

R = The data are unusable for all purposes.

SD = Sediment

SQL = Sample quantitation limit.

TAL = Target Analyte List.

U = The analyte was not detected. The associated numerical value is the contract required detection limit.

Table 6-4 NORTHWEST ALLOYS SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	**01374108**	**01374107**
CLP Inorganic ID	**MJ0KC8**	**MJ0KC7**
CLP Organic ID	**J0KC8**	**J0KC7**
E & E Sample ID	**01090408**	**01090407**
Station Location	**NABK01SD**	**NADT01SD**
Sample Depth (inches)	**0-8**	**0-8**
Description	**Background**	**Ditch near PPE 1**
TAL Metals (mg/kg)		
Aluminum	**2080**	**8420**
Arsenic	1.1 UJK	**4.9**
Barium	34.0 JB (48.8 SQL)	**170**
Calcium	**2730**	**26100**
Chromium	**5.4**	**10.8**
Copper	2.8 JB (6.1 SQL)	**18.7**
Iron	**5590**	**11300**
Lead	**2.0**	**7.5**
Magnesium	**1430**	**4000**
Manganese	**91.7**	**311**
Nickel	3.6 JB (9.8 SQL)	**10.9**
Potassium	605 JB	**1540 JK**
Vanadium	8.9 JB (12.2 SQL)	**16.3**
Zinc	**10.8**	**47.9**

Note: Bold type indicates sample concentration is above the detection limit.

Key

B = The reported concentration is between the instrument detection limit and the contract required detection limit.

BK = Background.

CLP = Contract Laboratory Program.

DT = Ditch.

E & E = Ecology and Environment, Inc.

EPA = United States Environmental Protection Agency.

ID = Identification.

J = The analyte was positively identified. The associated numerical value is an estimate.

K = Unknown bias.

mg/kg = Milligrams per kilogram.

NA = Northwest Alloys.

SD = Sediment.

SQL = Sample quantitation limit.

TAL = Target Analyte List.

U = The analyte was not detected. The associated numerical value is the contract required detection limit.

UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON Table 6-5 NAPOLEON MINE/MILL SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY

EPA Sample ID	**01374114**	**01374113**
CLP Inorganic ID	**MJ0KD5**	**MJ0KD4**
CLP Organic ID	**J0KD4**	**J0KD3**
E & E Sample ID	**01090413**	**01090412**
Station Location	**NPBK01SD**	**NPPP01SD**
Sample Depth (inches)	**0-8**	**0-8**
Description	**Background**	**PPE 1**
TAL Metals (mg/kg)		
Aluminum	**6980**	**8790**
Arsenic	**13.0**	**26.8**
Barium	**83.2**	**96.1**
Calcium	**56700**	**6340**
Chromium	**22.0**	**17.3**
Copper	**47.6**	**207**
Iron	**20300**	**36000**
Lead	**13.1**	**25.5**
Magnesium	**4660**	**3490**
Manganese	**293**	**190**
Nickel	**18.9**	**25.1**
Potassium	899 JB	**1430 JK**
Silver	1.1 JB (2.1 SQL)	**2.3**
Vanadium	**25.8**	**31.0**
Zinc	**62.2**	**77.6**

Note: Bold type indicates sample concentration is above the detection limit.

Underlined type indicates the sample results is significant as defined in Section 5.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
BK = Background.
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
mg/kg = Milligrams per kilogram.
NP = Napoleon Mine/Mill.
PPE = Probable point of entry.
SD = Sediment.
SQL = Sample quantitation limit.
TAL = Target Analyte List.

Table 6-6

VAN STONE MINE/MILL
SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPE
STEVENS COUNTY, WASHINGTON

EPA Sample ID		01254196	01254197	01254198	01254199	01254200	01254201	01254202	01
CLP Inorganic ID		MJ0GJ5	MJ0GJ6	MJ0GJ7	MJ0GJ8	MJ0GJ9	MJ0GK0	MJ0GK1	M
CLP Organic ID		NU	NU	NU	NU	NU	NU	NU	
E & E Sample ID		NU	NU	NU	NU	NU	NU	NU	
Station Location		VSWP01SS	VSWP02SS	VSWP03SS	VSWP04SS	VSWP05SS	VSWP06SS	VSWP07SS	VSV
Sample Depth (inches) Description	Background	0-6	0-6	0-6	0-6	0-6	0-6	0-6	
		Waste Rock Pile							
TAL Metals (mg/kg)									
Aluminum	18100	5640	3670	1600	2900	1230	1150	406	
Antimony	1.5 JB (15.1 SQL)	2.0 JB	0.61 UJK	1.1 JB	2.1 JB	2.2 JB	3.0 JB	14.5	
Arsenic	68.2	42.3	5.4	17.5	43.8	3.7 U	14.9	5.9	
Barium	548	47.6	31.4 JB	17.5 JB	50.0	113	21.3 JB	62.0	1
Beryllium	0.48 JB (6.3 SQL)	0.98 JB	0.25 JB	0.40 JB	0.27 JB	0.15 JB	0.08 JB	0.07 JB	0
Cadmium	7.8	41.4	15.4	10.5	38.8	69.7	124	234	
Calcium	118000	90300	44800	146000	55300	125000	85000	127000	1
Chromium	29.0	7.1	2.4	1.7 JB	1.7 JB	1.0 JB	0.87 JB	0.46 JB	
Cobalt	8.6 JB (63 SQL)	2.3 JB	1.5 JB	0.54 JB	1.2 JB	0.52 JB	1.5 JB	0.25 JB	0
Copper	55.2	12.5	4.9 JB	7.3	6.2 JL	1.9 JB	7.8 JL	2.5 JB	
Iron	25200	22600 JK	8710 JK	10800 JK	17100	7450	15300	12000	
Lead	183	1830	286	204	2080	12100	6090	76500	
Magnesium	17900	68200	33500	102000	34100	74200	46200	68400	1
Manganese	1370	822	236	407	278	207	202	227	
Mercury	0.06 JB (0.11 SQL)	1.3 JL	0.08 JB	0.32 JL	1.5	0.38	0.84	0.29	

Nickel	58.4	13.7	4.5 JB	3.8 JB	3.8 JB	2.3 JB	3.8 JB	2.1 JB	
Potassium	11660	942 JB	806 JB	278 JB	1240	477 JB	270 JB	162 JB	
Selenium	1.5 JL	0.71 U	0.69 U	0.79 JB	0.70 U	0.70 U	0.71 U	0.69 U	
Silver	6.7	0.94 JB	0.44 JB	0.53 JB	0.83 JB	0.88 JB	1.9 JB	4.4	
Sodium	3308 JB	377 JB	314 JB	202 JB	153 JB	332 JB	690 JB	1190	
Thallium	1.4 U	0.81 U	0.79 U	0.79 U	0.81 U	0.80 U	0.82 U	0.79 U	
Vanadium	51.2	21.1	12.2	6.9 JB	11.1	5.0 JB	4.0 JB	2.3 JB	
Zinc	835	20600 JK	15000 JK	5920 JK	10800	19500	45800	68000	

Table 6-6

VAN STONE MINE/MILL
SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPI
STEVENS COUNTY, WASHINGTON

EPA Sample ID		01254196	01254197	01254198	01254199	01254200	01254201	01254202	01
CLP Inorganic ID		MJ0GJ5	MJ0GJ6	MJ0GJ7	MJ0GJ8	MJ0GJ9	MJ0GK0	MJ0GK1	M
CLP Organic ID		NU	NU	NU	NU	NU	NU	NU	
E & E Sample ID		NU	NU	NU	NU	NU	NU	NU	
Station Location		VSWP01SS	VSWP02SS	VSWP03SS	VSWP04SS	VSWP05SS	VSWP06SS	VSWP07SS	VSV
Sample Depth	Background	0-6	0-6	0-6	0-6	0-6	0-6	0-6	
Description		Waste Rock Pile							
SVOCs (mg/kg)									
9H-Carbazole	NU	NU	NU	NU	NU	NU	NU	NU	
9H-Fluorene	NU	NU	NU	NU	NU	NU	NU	NU	
Acenaphthene	NU	NU	NU	NU	NU	NU	NU	NU	
Acenaphthylene	NU	NU	NU	NU	NU	NU	NU	NU	
Anthracene	NU	NU	NU	NU	NU	NU	NU	NU	
Benzo(a)anthracene	NU	NU	NU	NU	NU	NU	NU	NU	
Benzo(a)pyrene	NU	NU	NU	NU	NU	NU	NU	NU	
Benzo(g,h,i)perylene	NU	NU	NU	NU	NU	NU	NU	NU	
Benzo[b]Fluoranthene	NU	NU	NU	NU	NU	NU	NU	NU	
Benzo[k]fluoranthene	NU	NU	NU	NU	NU	NU	NU	NU	
Chrysene	NU	NU	NU	NU	NU	NU	NU	NU	
Dibenzo[a,h]anthracene	NU	NU	NU	NU	NU	NU	NU	NU	
Dibenzofuran	NU	NU	NU	NU	NU	NU	NU	NU	
Di-n-octylphthalate	NU	NU	NU	NU	NU	NU	NU	NU	
Indeno(1,2,3-cd)pyrene	NU	NU	NU	NU	NU	NU	NU	NU	
Isophorone	NU	NU	NU	NU	NU	NU	NU	NU	
Naphthalene	NU	NU	NU	NU	NU	NU	NU	NU	
Naphthalene, 2-methyl-	NU	NU	NU	NU	NU	NU	NU	NU	
Phenanthrene	NU	NU	NU	NU	NU	NU	NU	NU	
Pyrene	NU	NU	NU	NU	NU	NU	NU	NU	

Table 6-6

VAN STONE MINE/MILL
SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPI
STEVENS COUNTY, WASHINGTON

EPA Sample ID	Background	01254205	01254206	01254207	01254312	01254315	01254316	01254317	01
CLP Inorganic ID		MJ0GK4	MJ0GK5	MJ0GK6	MJ0EW6	MJ0EW9	MJ0EX0	MJ0EX1	M
CLP Organic ID		NU	NU	NU	NU	NU	NU	NU	

E & E Sample ID		NU	NU	NU	NU	NU	NU	NU	
Station Location		VSWP10SS	VSWP11SS	VSWP12SS	VSTP21SS	VSTP01SS	VSTP02SS	VSTP03SS	VS
Sample Depth (inches) Description		0-6	0-6	0-6	0-6	0-6	0-6	0-6	
		Waste Rock Pile			Tailings Pile				
TAL Metals (mg/kg)									
Aluminum	18100	3610	12100	796	148	3580	11100	8370	
Antimony	1.5 JB (15.1 SQL)	0.91 JB	0.64 U	1.4 JB	1.2 UJK	1.1 UJK	1.1 UJK	0.88 UJK	0
Arsenic	68.2	5.2	4.3 U	10.8	4.2 U	15.1	6.8	5.7 U	
Barium	548	97.4	130	26.4 JB	73.1	71.0	158	127	2
Beryllium	0.48 JB (6.3 SQL)	0.33 JB	1.6	0.07 JB	0.04 U	0.12 JB	0.46 JB	0.35 JB	0
Cadmium	7.8	10.1	5.5	15.0	8.6	7.3	1.9	2.4	
Calcium	118000	45800	7580	155000	134000	72800	16000	10100	
Chromium	29.0	3.6	1.3 JB	0.86 JB	8.7	3.0	12.9	10.1	
Cobalt	8.6 JB (63 SQL)	2.0 JB	3.9 JB	0.22 U	0.24 U	1.0 JB	5.0 JB	5.4 JB	0
Copper	55.2	4.8 JB	8.5 JL	5.7	76.2 JL	27.4 JL	26.9 JL	23.1 JL	2
Iron	25200	8720	14300	34000 JK	4950	8940	16300	12700	
Lead	183	1610	7.4	1520	4710	283	81.7	74.3	
Magnesium	17900	26700	8730	96700	81600	40100	10500	6800	
Manganese	1370	290	410	226	135	210	315	318	
Mercury	0.06 JB (0.11 SQL)	0.52	0.05 U	0.08 JB	0.09 JB	0.07 JB	0.06 U	0.06 U	0
Nickel	58.4	3.8 JB	5.9 JB	10.7	2.6 JB	4.8 JB	17.1	13.6	
Potassium	11660	891 JB	2380	267 JB	123 JB	598 JB	2930	2250	2
Selenium	1.5 JL	0.69 U	0.73 U	0.68 U	0.73 U	0.76 U	0.78 U	0.77 U	0
Silver	6.7	0.25 JB	0.28 JB	0.27 JB	0.36 JB	0.32 JB	0.51 JB	0.51 JB	0
Sodium	3308 JB	121 JB	54.0 JB	157 U	186 U	286 JB	282 JB	261 JB	2
Thallium	1.4 U	0.79 U	0.84 U	0.78 U	0.91 U	0.87 U	0.89 U	0.89 U	0
Vanadium	51.2	13.9	20.6	5.2 JB	1.9 JB	7.6 JB	45.2	33.1	
Zinc	835	3450	4950	6340 JK	2430	2770	813	907	

Table 6-6

VAN STONE MINE/MILL
SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPE
STEVENS COUNTY, WASHINGTON

EPA Sample ID		01254205	01254206	01254207	01254312	01254315	01254316	01254317	01
CLP Inorganic ID		MJ0GK4	MJ0GK5	MJ0GK6	MJ0EW6	MJ0EW9	MJ0EX0	MJ0EX1	M
CLP Organic ID		NU	NU	NU	NU	NU	NU	NU	
E & E Sample ID		NU	NU	NU	NU	NU	NU	NU	
Station Location		VSWP10SS	VSWP11SS	VSWP12SS	VSTP21SS	VSTP01SS	VSTP02SS	VSTP03SS	VS
Sample Depth	Background	0-6	0-6	0-6	0-6	0-6	0-6	0-6	
Description		Waste Rock Pile			Tailings Pile				
SVOCs (mg/kg)									
9H-Carbazole	NU	NU	NU	NU	NU	NU	NU	NU	
9H-Fluorene	NU	NU	NU	NU	NU	NU	NU	NU	
Acenaphthene	NU	NU	NU	NU	NU	NU	NU	NU	
Acenaphthylene	NU	NU	NU	NU	NU	NU	NU	NU	
Anthracene	NU	NU	NU	NU	NU	NU	NU	NU	
Benzo(a)anthracene	NU	NU	NU	NU	NU	NU	NU	NU	
Benzo(a)pyrene	NU	NU	NU	NU	NU	NU	NU	NU	
Benzo(g,h,i)perylene	NU	NU	NU	NU	NU	NU	NU	NU	
Benzo[b]Fluoranthene	NU	NU	NU	NU	NU	NU	NU	NU	
Benzo[k]fluoranthene	NU	NU	NU	NU	NU	NU	NU	NU	
Chrysene	NU	NU	NU	NU	NU	NU	NU	NU	

Dibenzo[a,h]anthracene	NU	NU	NU	NU	NU	NU	NU	NU	
Dibenzofuran	NU	NU	NU	NU	NU	NU	NU	NU	
Di-n-octylphthalate	NU	NU	NU	NU	NU	NU	NU	NU	
Indeno(1,2,3-cd)pyrene	NU	NU	NU	NU	NU	NU	NU	NU	
Isophorone	NU	NU	NU	NU	NU	NU	NU	NU	
Naphthalene	NU	NU	NU	NU	NU	NU	NU	NU	
Naphthalene, 2-methyl-	NU	NU	NU	NU	NU	NU	NU	NU	
Phenanthrene	NU	NU	NU	NU	NU	NU	NU	NU	
Pyrene	NU	NU	NU	NU	NU	NU	NU	NU	

Table 6-6

VAN STONE MINE/MILL
SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPE
STEVENS COUNTY, WASHINGTON

EPA Sample ID		01254320	01254321	01254322	01254323	01254331	01254332	01254333	01
CLP Inorganic ID		MJ0EX4	MJ0EX5	MJ0EX6	MJ0EX7	MJ0EY5	MJ0EY6	MJ0EY7	MJ
CLP Organic ID		NU	NU	NU	NU	NU	NU	NU	
E & E Sample ID		NU	NU	NU	NU	NU	NU	NU	
Station Location		VSTP06SS	VSTP07SS	VSTP08SS	VSTP09SS	VSTP10SS	VSTP11SS	VSTP12SS	VS
Sample Depth (inches) Description	Background	0-6	0-6	0-6	0-6	0-6	0-6	0-6	
		Tailings Pile							
TAL Metals (mg/kg)									
Aluminum	18100	12300	11700	12200	13500	4640	8870	3760	
Antimony	1.5 JB (15.1 SQL)	1.7 JB	1.6 JB	0.85 JB	0.76 UJK	0.62 UJK	1.1 JB	0.86 JB	
Arsenic	68.2	4.5 U	5.2 U	4.2 U	4.8 U	3.3 U	3.0 U	0.96 JB	
Barium	548	321	244	241	261	93.9	86.8	54.3	
Beryllium	0.48 JB (6.3 SQL)	0.40 JB	0.36 JB	0.38 JB	0.41 JB	0.19 JB	0.26 JB	0.15 JB	
Cadmium	7.8	1.0 JB	3.0	1.5	0.59 JB	4.9	5.2	0.67 JB	
Calcium	118000	4320	21000	7580	3540	28100	21000	4750 JL	3
Chromium	29.0	7.5	6.3	7.1	6.8	2.4	3.7	2.5	
Cobalt	8.6 JB (63 SQL)	3.3 JB	2.6 JB	2.8 JB	3.2 JB	1.9 JB	1.8 JB	1.4 JB	
Copper	55.2	11.1 JL	18.1 JL	14.1 JL	10.4 JL	25.3 JL	23.6 JL	5.4	
Iron	25200	10400	10900	10500	10400	9150	10600	5200	
Lead	183	35.9	109	51.2	18.8	167	143	32.7	
Magnesium	17900	2320	11000	4150	1960	18000	13300	3200 JL	18
Manganese	1370	675	427	429	506	420	287	260 JH	9
Mercury	0.06 JB (0.11 SQL)	0.06 U	0.06 U	0.06 U	0.06 U	0.07 JB	0.06 JB	0.05 U	
Nickel	58.4	11.5	9.6	10.0	9.1 JB	2.4 JB	4.3 JB	2.4 JB	
Potassium	11660	1520	1170 JB	1510	1420	1550	1030 JB	734 JB	
Selenium	1.5 JL	0.79 U	0.80 U	0.78 U	0.87 U	0.70 U	0.77 U	0.70 UJK	
Silver	6.7	0.5 JB	0.47 JB	0.48 JB	0.56 JB	0.26 JB	0.46 JB	0.14 U	
Sodium	3308 JB	272 JB	309 JB	286 JB	325 JB	203 JB	261 JB	193 JB	
Thallium	1.4 U	0.90 U	0.92 U	0.89 U	0.99 U	0.80 U	0.89 U	1.0 U	
Vanadium	51.2	22.3	19.7	23.1	20.3	14.2	15.6	8.8 JB	
Zinc	835	150	1100	565	121	2100	2610	341	

Table 6-6

VAN STONE MINE/MILL
SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPE
STEVENS COUNTY, WASHINGTON

EPA Sample ID		01254320	01254321	01254322	01254323	01254331	01254332	01254333	01
CLP Inorganic ID		MJ0EX4	MJ0EX5	MJ0EX6	MJ0EX7	MJ0EY5	MJ0EY6	MJ0EY7	M
CLP Organic ID		NU	NU	NU	NU	NU	NU	NU	
E & E Sample ID		NU	NU	NU	NU	NU	NU	NU	
Station Location		VSTP06SS	VSTP07SS	VSTP08SS	VSTP09SS	VSTP10SS	VSTP11SS	VSTP12SS	VS
Sample Depth	Background	0-6	0-6	0-6	0-6	0-6	0-6	0-6	
Description		Tailings Pile							
SVOCs (mg/kg)									
9H-Carbazole	NU	NU	NU	NU	NU	NU	NU	NU	
9H-Fluorene	NU	NU	NU	NU	NU	NU	NU	NU	
Acenaphthene	NU	NU	NU	NU	NU	NU	NU	NU	
Acenaphthylene	NU	NU	NU	NU	NU	NU	NU	NU	
Anthracene	NU	NU	NU	NU	NU	NU	NU	NU	
Benzo(a)anthracene	NU	NU	NU	NU	NU	NU	NU	NU	
Benzo(a)pyrene	NU	NU	NU	NU	NU	NU	NU	NU	
Benzo(g,h,i)perylene	NU	NU	NU	NU	NU	NU	NU	NU	
Benzo[b]Fluoranthene	NU	NU	NU	NU	NU	NU	NU	NU	
Benzo[k]fluoranthene	NU	NU	NU	NU	NU	NU	NU	NU	
Chrysene	NU	NU	NU	NU	NU	NU	NU	NU	
Dibenzo[a,h]anthracene	NU	NU	NU	NU	NU	NU	NU	NU	
Dibenzofuran	NU	NU	NU	NU	NU	NU	NU	NU	
Di-n-octylphthalate	NU	NU	NU	NU	NU	NU	NU	NU	
Indeno(1,2,3-cd)pyrene	NU	NU	NU	NU	NU	NU	NU	NU	
Isophorone	NU	NU	NU	NU	NU	NU	NU	NU	
Naphthalene	NU	NU	NU	NU	NU	NU	NU	NU	
Naphthalene, 2-methyl-	NU	NU	NU	NU	NU	NU	NU	NU	
Phenanthrene	NU	NU	NU	NU	NU	NU	NU	NU	
Pyrene	NU	NU	NU	NU	NU	NU	NU	NU	

Table 6-6

VAN STONE MINE/MILL
SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND
STEVENS COUNTY, WASHINGTON

EPA Sample ID		01254336	01254337	01254338	01254339	01254324	01254325	01254326	01
CLP Inorganic ID		MJ0EZ0	MJ0EZ1	MJ0EZ2	MJ0EZ3	MJ0F12	MJ0EX9	MJ0EY0	M
CLP Organic ID		NU	NU	NU	NU	J0EX8	J0EX9	J0EY0	J
E & E Sample ID		NU	NU	NU	NU	NU	NU	NU	
Station Location		VSTP15SS	VSTP16SS	VSTP17SS	VSTP18SS	VSSS01SS	VSSS02SS	VSSS03SS	VS
Sample Depth (inches) Description	Background	0-6	0-6	0-6	0-6	0-6	0-6	0-6	
		Tailings Pile							St
TAL Metals (mg/kg)									
Aluminum	18100	3710	146	7560	4950	1480	2740	3970	
Antimony	1.5 JB (15.1 SQL)	0.60 U	1.0 JB	0.61 U	0.67 JB	5.5 JB	2.4 JB	0.70 UJK	I
Arsenic	68.2	1.2 JB	9.6	2.7	0.96 U	16.5	9.7	2.2 U	
Barium	548	38.9 JB	5.2 JB	128	82.5	37 JB	54.3	41.2 JB	
Beryllium	0.48 JB (6.3 SQL)	0.15 JB	0.02 U	0.37 JB	0.18 JB	0.07 JB	0.13 JB	0.18 JB	C
Cadmium	7.8	0.36 JB	14.3	0.86 JB	0.74 JB	702	36.6	1.9	

Calcium	118000	2110 JL	84300 JL	5150 JL	8150 JL	37200 JL	55100	12500	
Chromium	29.0	2.9	1.3 JB	3.9	2.7	2.2 JB	3.7	3.7	
Cobalt	8.6 JB (63 SQL)	1.2 JB	0.24 U	3.5 JB	1.5 JB	1 JB	2.1 JB	1.6 JB	
Copper	55.2	3.6 JB	28.7	5.9	5.9	202	461 JL	5.0 JB	
Iron	25200	5070	6380	12200	7000	32400	15500	7520	
Lead	183	16.3	270	25.2	33.8	10900	11000	114	
Magnesium	17900	1630 JL	44000 JL	5500 JL	5420 JL	22600 JL	32800	8570	
Manganese	1370	131 JH	110 JH	388 JH	211 JH	412 JH	267	160	
Mercury	0.06 JB (0.11 SQL)	0.05 U	0.17	0.05 U	0.05 U	3.2	0.21	0.05 U	
Nickel	58.4	2.6 JB	2.5 JB	2.9 JB	2.5 JB	5.1 JB	4.8 JB	2.5 JB	
Potassium	11660	815 JB	122 JB	3090	1180	499 JB	1100 JB	1120 JB	
Selenium	1.5 JL	0.70 UJK	0.73 UJK	0.71 UJK	0.71 UJK	0.92 UJK	0.88 U	0.79 U	
Silver	6.7	0.13 U	0.29 U	0.28 U	0.23 U	3.3	1.9 JB	0.22 JB	
Sodium	3308 JB	279 JB	286 JB	290 JB	286 JB	6080	296 JB	251 JB	
Thallium	1.4 U	1.0 U	1.1 U	1.1 U	1.1 U	1.4 JB	1.0 U	0.91 U	
Vanadium	51.2	9.0 JB	1.6 JB	24.6	11.1	4.5 JB	11.5 JB	14.6	
Zinc	835	171	5870	432	312	189000	12000	812	

Table 6-6

VAN STONE MINE/MILL
SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND
STEVENS COUNTY, WASHINGTON

EPA Sample ID		01254336	01254337	01254338	01254339	01254324	01254325	01254326	01
CLP Inorganic ID		MJ0EZ0	MJ0EZ1	MJ0EZ2	MJ0EZ3	MJ0F12	MJ0EX9	MJ0EY0	M
CLP Organic ID		NU	NU	NU	NU	J0EX8	J0EX9	J0EY0	J
E & E Sample ID		NU	NU	NU	NU	NU	NU	NU	
Station Location		VSTP15SS	VSTP16SS	VSTP17SS	VSTP18SS	VSSS01SS	VSSS02SS	VSSS03SS	VS
Sample Depth	Background	0-6	0-6	0-6	0-6	0-6	0-6	0-6	
Description		Tailings Pile							SI
SVOCs (mg/kg)									
9H-Carbazole	NU	NU	NU	NU	NU	175	145 U	72.8 U	
9H-Fluorene	NU	NU	NU	NU	NU	794	145 U	72.8 U	
Acenaphthene	NU	NU	NU	NU	NU	618	145 U	72.8 U	
Acenaphthylene	NU	NU	NU	NU	NU	25.1 J	145 U	72.8 U	
Anthracene	NU	NU	NU	NU	NU	779	145 U	72.8 U	
Benzo(a)anthracene	NU	NU	NU	NU	NU	1440	145 U	8.5 J	
Benzo(a)pyrene	NU	NU	NU	NU	NU	1680	290 U	146 U	
Benzo(g,h,i)perylene	NU	NU	NU	NU	NU	901	145 U	72.8 U	
Benzo[b]Fluoranthene	NU	NU	NU	NU	NU	654	290 U	146 U	
Benzo[k]fluoranthene	NU	NU	NU	NU	NU	983	145 U	72.8 U	
Chrysene	NU	NU	NU	NU	NU	1650	145 U	72.8 U	
Dibenzo[a,h]anthracene	NU	NU	NU	NU	NU	140	145 U	72.8 U	
Dibenzofuran	NU	NU	NU	NU	NU	177	145 U	72.8 U	
Di-n-octylphthalate	NU	NU	NU	NU	NU	78.8 U	R	72.8 U	
Indeno(1,2,3-cd)pyrene	NU	NU	NU	NU	NU	688	290 U	146 U	
Isophorone	NU	NU	NU	NU	NU	78.8 U	99.7 J	72.8 U	
Naphthalene	NU	NU	NU	NU	NU	1030	145 U	72.8 U	
Naphthalene, 2-methyl-	NU	NU	NU	NU	NU	610	145 U	72.8 U	
Phenanthrene	NU	NU	NU	NU	NU	5090	145 U	72.8 U	
Pyrene	NU	NU	NU	NU	NU	4350	145 U	72.8 U	

Note: Bold type indicates sample concentration is above the detection limit.
Underlined type indicates the sample results is significant as defined in Section 5.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency
H = High bias.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
mg/kg = Milligrams per kilogram
µg/kg = Micrograms per kilogram.
NU = Not utilized.
SQL = Sample quantitation limit.
SS = Surface soil.
SS = Stained soil.
SVOCs = Semivolatile Organic Compounds.
TAL = Target Analyte List.
TP = Tailings pile.
U = The analyte was not detected. The associated numerical value is the contract required detection limit.
VS = Van Stone Mine/Mill.
WP = Waste Rock Pile.

Table 6-7

VAN STONE MINE/MILL
SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS
PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS
STEVENS COUNTY, WASHINGTON

EPA Sample ID		01254363	01254313 01254340	01254314 01254341	01254361	01254364
CLP Inorganic ID		MJ0FK2	MJ0EW7	MJ0EW8	MJ0FK0	MJ0FK3
CLP Organic ID		J0FJ1	J0EZ4	J0EZ5	J0FK0	J0FJ2
E & E Sample ID		NU	NU	NU	NU	NU
Station Location		VSMW01SD	VSPP01SD	VSPP02SD	VSPP03SD	VSPP04SD
Sample Depth (inches)		6-8	6-8	6-8	6-8	6-8
Description	*Background*	Mine Pit	PPE 1	PPE 2	PPE 3	PPE 4
TAL Metals (mg/kg)						
Aluminum	20200	2070	1140	2010	1970	5440
Arsenic	13.0	3.2 U	9.2	2.1 U	13.8	1.4 U
Barium	450	48.6 JB	41.0 JB	27.8 JB	20.7 JB	86.0

Cadmium	**3.4**	1.2 JB	**6.0**	0.07 U	**11.9**	0.17 JB
Calcium	**109000**	**32000**	**99300**	1030 JB	**28200**	**2800**
Chromium	**32.3**	2.4 JB	1.5 JB	1.7 JB	2.0 JB	2.9 JB
Cobalt	**11.9**	0.88 JB	0.3 U	0.71 JB	1.1 JB	1.5 JB
Copper	**69.3**	2.1 JB	**23.0 JL**	1.5 JB	2.3 JB	3.3 JB
Iron	**27900**	**3730**	**4460**	**3710**	**6300**	**7560**
Lead	**124**	**50.4**	**466**	**2.2**	**124**	**8.1**
Magnesium	**33500**	**17000**	**56100**	709 JB	**14400**	1410 JB
Manganese	**673**	**120**	**95.7**	**192**	**162**	386
Nickel	**31.9**	2.2 JB	1.7 JB	1.0 JB	2.9 JB	2.6 JB
Potassium	**3920 JK**	508 JB	265 JB	485 JB	515 JB	847 JB
Vanadium	**47.4**	6.2 JB	4.4 JB	6.6 JB	10.0 JB	12.7 JB
Zinc	**239**	**526**	**1960**	**13.0**	**3670**	**112**
Pesticide/PCBs (mg/kg)						
Endrin Ketone	**4.0**	4.0 U	4.4 U	3.7 U	4.1 U	4.6 U

Note: Bold type indicates sample concentration is above the detection limit. Underlined type indicates the sample results is significant as defined in Section 5.

Key:

B	= The reported concentration is between the instrument detection limit and the contract required detection limit.
CLP	= Contract Laboratory Program.
E & E	= Ecology and Environment, Inc.
EPA	= United States Environmental Protection Agency.
ID	= Identification.
J	= The analyte was positively identified. The associated numerical value is an estimate.
K	= Unknown bias.
mg/kg	= Milligrams per kilogram.
µγ/κγ	= Micrograms per kilogram.
MW	= Mine water.
NU	= Not utilized.
PCBs	= Polychlorinated biphenyls.
PPE	= Probable point of entry.
SD	= Sediment.
TAL	= Target Analyte List.
U	= The analyte was not detected. The associated numerical value is the contract required detection limit.
VS	= Van Stone Mine/Mill.

STEVENS COUNTY, WASHINGTON Table 6-8 LeROI/NORTHPORT SMELTER SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS

EPA Sample ID	01374188	01374182	01374183	01374184
CLP Inorganic ID	MJ0KK8	MJ0KK0	MJ0KK1	MJ0KK2
CLP Organic ID	NU	NU	NU	NU
E & E Sample ID	NU	NU	NU	NU
Station Location	NSBK02SS	NSSL01SS	NSSL02SS	NSSL03SS
Sample Depth (inches)	0-6	0-6	0-6	0-6
Description	Background	Slag		
TAL Metals (mg/kg)				
Aluminum	**4810**	**13200**	**13600**	**8070**
Antimony	1.5 JB (15.1 SQL)	11.8 JB	**21.4 JL**	**60.6 JL**
Arsenic	**2.6**	**294 JL**	**297 JL**	**209 JL**
Barium	**194**	**157**	**178**	**87.1**
Cadmium	**1.3**	**2.0**	**26.9**	**105**
Calcium	**90500**	**4790 JK**	**23700 JK**	**15800 JK**
Chromium	**17.6**	**13.0**	**10.8**	**10.4**
Cobalt	2.9 JB (12.6 SQL)	**20.5**	**112**	**42.0**
Copper	**17.3**	**2430**	**14700**	**4480**
Iron	**7690**	**31800**	**35700**	**23200**
Lead	**57.0**	**2600**	**7980**	**10500**
Magnesium	**3520**	**3550**	**8040**	**5970**
Manganese	**152**	**275**	**594**	**351**
Mercury	0.06 U	**0.28**	**0.34**	**0.40**
Nickel	8.0 JB (10.1 SQL)	**12.0**	**25.3**	**16.5**
Potassium	897 JB	**1310**	**4900**	**1910**
Selenium	1.1 JB (1.3 SQL)	**1.2**	0.76 U	**1.4**
Silver	0.57 JB (2.5 SQL)	**13.1**	**21.3**	**26.7**
Vanadium	**13.8**	**33.8**	**44.1**	**27.9**
Zinc	**60.9**	**120**	**978**	**5420**

Note: Bold type indicates sample concentration is above the detection limit. Underlined type indicates the sample results is significant as defined in Section 5.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
BK = Background.
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias

Low bias, mg/kg = Milligrams per kilogram, NS = LeRoi/Northport Smelter, NU = Not utilized, SL = Slag, SQL = Sample quantitation

limit. SS = Surface soil. TAL = Target Analyte List. U = The analyte was not detected. The associated numerical value is the contract required detection limit.

Table 6-9

LeROI/NORTHPORT SMELTER
SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSI
STEVENS COUNTY, WASHINGTON

EPA Sample ID	01198040	01264431	01264432	01264433	01264434	01264435	01264436	01264437
CLP Inorganic ID	NU	MJ0GP0	MJ0GP1	MJ0GP2	MJ0GP3	MJ0GP4	MJ0GP5	MJ0GP6
CLP Organic ID	NU	NU	NU	NU	NU	NU	NU	NU
E & E Sample ID	NU	NU	NU	NU	NU	NU	NU	NU
Station Location	NU	NSSL01SD	NSSL02SD	NSSL03SD	NSSL04SD	NSSL05SD	NSSL06SD	NSSL07SD
Sample Depth (inches)	NU	0-6	0-6	0-6	0-6	0-6	0-6	0-6
Description	Background	Columbia River Slag (PPE 3)						
TAL Metals (mg/kg)								
Arsenic	2 U	7.5	15	19.3	23.9	41.4	10.9	12.3
Cadmium	0.47	1.6	0.81 JB	0.74 JB	1.5	1.7	3.3	4.9
Copper	3.6	238 JL	1540 JL	2070 JL	2530 JL	2960 JL	349 JL	257 JL
Lead	12	230 JK	246 JK	292 JK	388 JK	507 JK	470 JK	548 JK
Mercury	0.0004 U	0.06 U	0.06 U	0.07 U	0.06 U	0.06 U	0.08 JB	0.11 JB
Zinc	26.9	1520	10500	13000	15100	16900	3920	2800

Note: The highest concentration between the sample and the duplicate of the sample. Sample was collected by Ecology in May of 2001 at Lower Arrow Lake in Canada.
Bold type indicates sample concentration is above the detection limit.
Underlined type indicates the sample results is significant as defined in Section 5.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
BK = Background
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.

= Low bias. mg/kg = Milligrams per kilogram. NS = Northport Smelter. NU = Not utilized. PPE = Probable point of entry. R = The data are unusable for all purposes SD = Sediment. SL = Slag. SQL = Sample quantitation limit. TAL = Target Analyte List. U = The analyte was not detected. The associated numerical value is the contract required detection limit.

Table 6-10 LeROI/NORTHPORT SMELTER SEDIMENT SAMPLE ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	01374187	01374186	01374185
CLP Inorganic ID	MJ0KK5	MJ0KK4	MJ0KK3

CLP Organic ID	J0KJ3	J0KJ2	J0KJ1
E & E Sample ID	01090432	01090431	01090430
Station Location	NSBK01SD	NSPP01SD	NSDT01SD
Sample Depth (inches)	0-8	0-8	0-8
Description	Background	PPE 1	PPE 2
TAL Metals (mg/kg)			
Aluminum	2740	7650 JK	7170
Antimony	0.73 UJL	8.3 JB	0.68 U
Arsenic	1.2 UJL	39.9 JK	17.6 JL
Barium	145	413 JK	69.0
Cadmium	0.26 JB (1.3 SQL)	5.9 JK	2.6
Calcium	90700 JK	222000 JK	3110 JK
Chromium	7.6	34.8 JK	14.5
Cobalt	1.7 JB (12.6 SQL)	16.3 JB	5.8 JB
Copper	6.8	1090 JK	124
Iron	6560	15400 JK	13700
Lead	16.6	887 JK	87.1
Magnesium	2600	5950 JK	3650
Manganese	87.3	339 JK	261
Mercury	0.06 U	R	0.06 U
Nickel	4.1 JB (10.1 SQL)	14.5 JB	13.3
Potassium	485 JB	1650 JB	1380
Selenium	0.86 U	5.8 JK	0.79 U
Silver	0.15 U	3.3 JB	0.92 JB
Sodium	175 JB	684 JB	189 JB
Vanadium	14.6	24.8 JB	24.7
Zinc	26.4	223	92.2

Note: Bold type indicates sample concentration is above the detection limit. Underlined type indicates the sample results is significant as defined in Section 5.

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
BK = Background.
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias

= Low bias. mg/kg = Milligrams per kilogram. NS = Northport Smelter. PP = PPE. PPE = Probable point of entry. R = The data are unusable for all purposes. SD = Sediment. SQL = Sample quantitation limit. TAL = Target Analyte List. U = The analyte was not detected. The associated numerical value is the contract required detection limit.

Table 6-11 BLACK ROCK MINE/MILL SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS ST COUNTY, WASHINGTON

EPA Sample ID	Background	01254160	01254161	01254162	01254163	012
CLP Inorganic ID		MJ0GE9	MJ0GF0	MJ0GF1	MJ0GF2	MJ
CLP Organic ID		NU	NU	NU	NU	
E & E Sample ID		NU	NU	NU	NU	
Station Location		BRWP01SS	BRWP02SS	BRWP03SS	BRMS01SS	BRM

Sample Depth (inches)		0-6	0-6	0-6	0-6	
Description		Waste Rock Pile			Mill Soil	
TAL Metals (mg/kg)						
Aluminum	18100	6030	3590	4470	7700	
Arsenic	68.2	62.1 JL	15.8 JL	15.4 JL	5.3 JL	
Barium	548	3870	2300	2890	593	
Cadmium	7.8	851 JH	688 JH	1090 JH	27.3 JH	16.
Calcium	118000	99000	148000	113000	67200	
Chromium	29.0	2.5	2.6	1.9 JB	14.0	
Cobalt	8.6 JB (63 SQL)	4.0 JB	2.5 JB	2.6 JB	4.8 JB	
Copper	55.2	389	228	398	22.5	
Iron	25200	15800	6850	6390	12600	
Lead	183	6520	555	1040	1800	
Magnesium	17900	29100	49200	26800	21400	
Manganese	1370	99.8	171	129	268	
Mercury	0.06 JB (0.11 SQL)	26.4	10	18.8	0.19	
Nickel	58.4	6.4 JB	5.1 JB	3.2 JB	14.6	
Potassium	11660	674 JB	211 JB	142 JB	1160	
Selenium	1.5 JL	3.7	2.1	2.3	0.74 U	
Silver	6.7	4.2	1.6 JB	3.8	0.72 JB	
Sodium	3308 JB	6810	5060	8780	290 JB	
Vanadium	51.2	5.3 JB	5.7 JB	7.0 JB	19.8	
Zinc	835	180000	141000	207000	7550	

Note: Bold type indicates sample concentration is above the detection limit. Underlined type indicates the sample results is significant as defined in Section 5.

Key:

B	= The reported concentration is between the instrument detection limit and the contract required detection limit.
BR	= Black Rock Mine/Mill.
CLP	= Contract Laboratory Program.
E & E	= Ecology and Environment, Inc.
EPA	= United States Environmental Protection Agency.
H	= High bias.
ID	= Identification.
J	= The analyte was positively identified. The associated numerical value is an estimate.
L	= Low bias.
mg/kg	= Milligrams per kilogram.
MS	= Mill soil.
NU	= Not utilized.

SS = Surface soil.
TAL = Target Analyte List.
U = The analyte was not detected. The associated numerical value is the contract required detection limit.
WP = Waste Rock Pile

STEVENS COUNTY, WASHINGTON Table 6-12 GREAT WESTERN MINE SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS

EPA Sample ID		01254177	01254178
CLP Inorganic ID		MJ0GG6	MJ0GG7
CLP Organic ID		NU	NU
E & E Sample ID		NU	NU
Station Location		GWWP01SS	GWWP02SS
Sample Depth (inches)		0-6	0-6
Description	Background	Waste Rock Pile	
TAL Metals (mg/kg)			
Aluminum	18100	7470 JL	1970 JL
Arsenic	68.2	68.4 JH	61.5 JH
Barium	548	68.8	19.6 JB
Cadmium	7.8	166 JL	490 JL
Calcium	118000	78900 JL	97300 JL
Chromium	29.0	21.6 JL	14.2 JL
Cobalt	8.6 JB (63 SQL)	1.3 JB	0.33 JB
Copper	55.2	57.7 JL	46.7 JL
Iron	25200	83600 JL	57300 JL
Lead	183	6200	24000
Magnesium	17900	49900 JL	61400 JL
Manganese	1370	413 JL	572 JL
Mercury	0.06 JB (0.11 SQL)	2.5	4.3
Nickel	58.4	15.4 JL	17.7 JL
Potassium	11660	766 JB	232 JB
Selenium	1.5 JL	R	R
Silver	6.7	5.3	7.5
Sodium	3308 JB	732 JB	2830
Thallium	1.4 U	4.5	2.3
Vanadium	51.2	48.5 JL	33.8 JL
Zinc	835	52700 JK	118000 JK

Note: Bold type indicates sample concentration is above the detection limit.
Underlined type indicates the sample results is significant as defined in Section 5. Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.

GW = Great Western Mine.
H = High bias

ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.

= Low bias. mg/kg = Milligrams per kilogram. NU = Not utilized. R = The data are unusable for all purposes. SS = Surface soil. TAL = Target Analyte List. U = The analyte was not detected. The associated numerical value is the contract required detection limit. WP = Waste Rock Pile.

Table 6-13

LAST CHANCE MINE/MILL
SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS
STEVENS COUNTY, WASHINGTON

EPA Sample ID		01254174	01254175	01254176	01254169	01254170	01254171
CLP Inorganic ID		MJ0GG3	MJ0GG4	MJ0GG5	MJ0GF8	MJ0GF9	MJ0GG0
CLP Organic ID		NU	NU	NU	NU	NU	NU
E & E Sample ID		NU	NU	NU	NU	NU	NU
Station Location		LCWP01SS	LCWP02SS	LCWP03SS	LCTP01SS	LCTP02SS	LCTP03SS
Sample Depth (inches) Description	Background	0-6 Waste Rock Pile	0-6 Waste Rock Pile	0-6 Waste Rock Pile	0-6 Tailings Pile	0-6 Tailings Pile	0-6 Tailings Pile
TAL Metals (mg/kg)							
Aluminum	18100	2980	3480	1890	585	418	649
Arsenic	68.2	101	105	135	112 JL	120 JL	82.9 JL
Barium	548	26.0 JB	25.8 JB	18.4 JB	18.1 JB	14.1 JB	18.2 JB
Cadmium	7.8	285	349	326	301 JH	269 JH	518 JH
Calcium	118000	44400	34700	38800	68200	74800	67000
Chromium	29.0	12.1	11.3	12.8	10.7	10.3	9.2
Cobalt	8.6 JB (63 SQL)	0.24 U	0.24 U	0.26 U	0.24 U	0.24 U	0.23 U
Copper	55.2	48.1 JL	51.6 JL	56.0 JL	53.2	49.2	39.1
Iron	25200	156000	161000	167000	181000	166000	113000
Lead	183	113000	125000	170000	110000	72900	110000
Magnesium	17900	28300	22500	24200	39500	46700	32300
Manganese	1370	200	198	216	129	108	98.2
Mercury	0.06 JB (0.11 SQL)	1.5	2.0	2.7	2.3	1.4	1.3
Nickel	58.4	13.1	13.3	12.5	10.5	9.7	8.8
Potassium	11660	366 JB	444 JB	261 JB	83.0 JB	69.2 JB	118 JB
Selenium	1.5 JL	0.75 U	0.75 U	0.80 U	0.74 U	0.74 U	0.71 U
Silver	6.7	9.9	10.0	12.1	8.7	6.2	7.5
Sodium	3308 JB	1000 JB	1520	1500	1490	1160	2960
Thallium	1.4 U	6.5	6.9	8.3	0.85 U	0.85 U	0.82 U
Vanadium	51.2	12.0	12.9	14.8	9.5 JB	11.2	8.5 JB
Zinc	835	67700	89800	89300	72600	63900	112000

Note: Bold type indicates sample concentration is above the detection limit. Underlined type indicates the sample results is significant as defined in Section 5.

Key:

B	= The reported concentration is between the instrument detection limit and the contract required detection limit.
CLP	= Contract Laboratory Program.
E & E	= Ecology and Environment, Inc.
EPA	= United States Environmental Protection Agency.
H	= High bias.
ID	= Identification.
J	= The analyte was positively identified. The associated numerical value is an estimate.
L	= Low bias
LC	= Last Chance Mine/Mill.
mg/kg	= Milligrams per kilogram.
MS	= Mill soil.
NU	= Not utilized.
SS	= Surface soil.
TAL	= Target Analyte List.
TP	= Tailings pile.
U	= The analyte was not detected. The associated numerical value is the contract required detection limit.
WP	= Waste Rock Pile

UPPER COLUMBIA RIVER MINES AND MILLS STEVENS COUNTY, WASHINGTON Table 6-14 LAST CHANCE MINE/MILL SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS

EPA Sample ID		01254168	01254173
CLP Inorganic ID		MJ0FG7	MJ0GG2
CLP Organic ID		NU	NU
E & E Sample ID		NU	NU
Station Location		LCPP01SD	LCPP02SD
Sample Depth (inches)		0-8	0-8
Description	Background	PPE 1	PPE 2
TAL Metals (mg/kg)			
Aluminum	20200	5800	1280
Arsenic	13.0	30.5 JL	1.9 UJK
Barium	450	112	70.5 JB
Cadmium	3.4	56.9 JH	3.2 JH
Calcium	109000	191000	197000
Chromium	32.3	9.5	1.9 JB
Cobalt	11.9	1.2 JB	0.51 U
Copper	69.3	75.1	3.9 JB
Iron	27900	39000	4940

Lead	**124**	**14600**	**385**
Magnesium	**33500**	**14500**	**7540**
Manganese	**673**	**170**	**58.5**
Mercury	0.10 JB (0.102 SQL)	**0.46**	**1.2**
Nickel	**31.9**	8.6 JB	2.5 JB
Potassium	**3920 JK**	623 JB	315 JB
Vanadium	**47.4**	9.6 JB	3.1 JB
Zinc	**239**	**13400**	**1100**

Note: Bold type indicates sample concentration is above the detection limit.

Underlined type indicates the sample results is significant as defined in Section 5.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
H = High bias.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
LC = Last Chance Mine/Mill.
mg/kg = Milligrams per kilogram.
µg/kg = Micrograms per kilogram.
PPE = Probable point of entry.
SD = Sediment.
SQL = Sample quantitation limit.
TAL = Target Analyte List.
U = The analyte was not detected. The associated numerical value is the contract required detection limit.

PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS Table 6-15
DEEP CREEK MINE SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS STEVENS COUNTY, WASHINGTON

EPA Sample ID		**01254251**	**01254252**	**01254253**	**01254254**	**01254267**	**01254255**
CLP Inorganic ID		**MJ0EN5**	**MJ0EN6**	**MJ0EN7**	**MJ0EN8**	**MJ0EQ1**	**MJ0EN9**
CLP Organic ID		**NU**	**J0EN6**	**J0EN7**	**J0EN8**	**NU**	**J0EN9**
E & E Sample ID		**NU**	**NU**	**NU**	**NU**	**NU**	**NU**
Station Location		**DCWP01SS**	**DCWP02SS**	**DCWP03SS**	**DCWP04SS**	**DCWP05SS**	**DCTP01SS**
Sample Depth (inches) Description	**Background**	**0-6**	**0-6**	**0-6**	**0-6**	**0-6**	**0-6**
		Waste Rock Pile					
TAL Metals (mg/kg)							
Aluminum	**18100**	**133**	**1350**	**2070**	**1750**	**75.7**	**761**
Arsenic	**68.2**	**4.5**	**5.4**	**4.4**	**2.8**	1.9 JB	**12.3**
Barium	**548**	1.4 U	23.5 JB	**57.6**	30.2 JB	1.4 U	10.6 JB
Cadmium	**7.8**	**8.1**	**16.3**	**24.9**	**25.2**	**15.1**	**147**

Calcium	118000	187000	173000	132000	153000	180000	137000
Chromium	29.0	0.41 U	2.3	3.4	3.2	0.62 U	2.7
Cobalt	14.7	0.22 U	0.58 JB	1.4 JB	1.4 JB	0.26 U	0.29 U
Copper	55.2	13.1 JL	10.4 JL	10.2 JL	8.6 JL	10.0 JL	52.0 JL
Iron	25200	2120	7160	7210	6090	2310	11600
Lead	183	476	799	558	416	324	6110
Magnesium	17900	125000	105000	67000	93900	117000	75500
Manganese	1370	172	184	175	206	167	186
Mercury	0.06 JB (0.11 SQL)	0.06 JB	0.25	0.14	0.21	0.06 U	2.7
Nickel	58.4	0.67 U	3.2 JB	4.1 JB	3.6 JB	0.74 JB	4.2 JB
Potassium	11660	45.5 JB	224 JB	449 JB	413 JB	33.2 JB	95.6 JB
Selenium	1.5 JL	0.69 U	0.69 U	0.76 U	0.75 U	0.79 U	0.89 U
Silver	6.7	0.16 U	0.42 JB	0.18 JB	0.18 U	0.19 U	2.4 JB
Sodium	377 JB	186 JB	213 JB	230 JB	230 JB	192 JB	604 JB
Vanadium	51.2	1.6 JB	11.4	7.2 JB	6.4 JB	5.2 JB	14.8
Zinc	835	2030	4220	6770	7780	4680	37500
Pesticide/PCBs (mg/kg)							
4,4'-DDT	3.5 U	NU	3.4 U	3.7 U	3.6 U	NU	4.5 U

UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS Table 6-15 DEEP CREEK MINE SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY STEVENS COUNTY, WASHINGTON

EPA Sample ID		01254259	01254260	01254261	01254262	01254263	01254264
CLP Inorganic ID		MJ0EP3	MJ0EP4	MJ0EP5	MJ0EP6	MJ0EP7	MJ0EP8
CLP Organic ID		J0EP3	J0EP4	J0EP5	J0EP6	J0EP7	J0EP8
E & E Sample ID		NU	NU	NU	NU	NU	NU
Station Location		DCTP05SS	DCTP06SS	DCTP07SS	DCTP08SS	DCTP09SS	DCTP10SS
Sample Depth (inches) Description	**Background**	0-6	0-6	0-6	0-6	0-6	0-6
		Tailings Pile					
TAL Metals (mg/kg)							
Aluminum	18100	819	617	455	593	750	405
Arsenic	68.2	12	15.6	11.4	14.6	22.6	9.7
Barium	548	13.2 JB	11.3 JB	5.9 JB	9.1 JB	29.0 JB	7.3 JB
Cadmium	7.8	169	232	142	162	192	122
Calcium	118000	147000	154000	147000	144000	147000	149000
Chromium	29.0	2.2 JB	2.2 JB	1.9 JB	2.5 JB	2.8	1.6 JB
Cobalt	14.7	0.37 JB	0.28 U	0.29 U	0.29 U	0.35 JB	0.30 U
Copper	55.2	32.0 JL	43.7 JL	41.0 JL	53.2 JL	35.5 JL	31.2 JL
Iron	25200	18500	18300	11200	13700	15300	10700
Lead	183	5410	13300	4900	6290	8250	5200
Magnesium	17900	85000	92200	85100	83900	80600	85000
Manganese	1370	194	186	199	202	186	170
Mercury	0.06 JB (0.11 SQL)	1.7	3.2	1.6	2.4	2.3	0.97

Nickel	**58.4**	6.4 JB	6.8 JB	3.7 JB	4.8 JB	5.9 JB	3.3 JB
Potassium	**11660**	153 JB	78.4 JB	43.6 JB	74.4 JB	78.3 JB	55.3 JB
Selenium	**1.5 JL**	0.84 U	0.85 U	0.89 U	0.91 U	0.92 U	0.94 U
Silver	**6.7**	2.1 JB	**3.0**	2.1 JB	2.7 JB	2.4 JB	1.6 JB
Sodium	377 JB	847 JB	1130 JB	531 JB	814 JB	767 JB	559 JB
Vanadium	**51.2**	11.7 JB	10.5 JB	**14.4**	**20.5**	**29.5**	11.4 JB
Zinc	**835**	**48300**	**58000**	**33300**	**46000**	**44300**	**33100**
Pesticide/PCBs (mg/kg)							
4,4'-DDT	3.5 U	4.2 U	4.1 U	4.3 U	4.3 U	3.9 JQ	4.3 U

PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS Table 6-15 DEEP CREEK MINE SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS STEVENS COUNTY, WASHINGTON

EPA Sample ID		**01254269**	**01254270**	**01254272**	**01254273**	**01254274**
CLP Inorganic ID		**MJ0EQ3**	**MJ0EQ4**	**MJ0EQ6**	**MJ0EQ7**	**MJ0EQ8**
CLP Organic ID		**J0EQ3**	**J0EQ4**	**J0EQ6**	**J0EQ7**	**J0EQ8**
E & E Sample ID		**NU**	**NU**	**NU**	**NU**	**NU**
Station Location		**DCTP14SS**	**DCTP15SS**	**DCTP16SS**	**DCTP17SS**	**DCTP18SS**
Sample Depth (inches) Description	**Background**	**0-6**	**0-6**	**0-6**	**0-6**	**0-6**
		Tailings Pile				
TAL Metals (mg/kg)						
Aluminum	**18100**	**189**	**913**	**1500**	**2820**	**3730**
Arsenic	**68.2**	**4.7**	**9.1**	11.5 U	1.5 U	2.6 U
Barium	**548**	2.6 JB	17.6 JB	125 JB	34.6 JB	32.1 JB
Cadmium	**7.8**	**23.8**	**96.2**	**261**	**30.7**	**18.3**
Calcium	**118000**	**175000**	**136000**	**155000**	**131000**	**142000**
Chromium	**29.0**	0.66 U	**6.7**	3.8 JB	**3.5**	**4.8**
Cobalt	**14.7**	0.23 U	0.53 JB	1.3 U	0.88 JB	1.3 JB
Copper	**55.2**	4.4 JB	**21.1 JL**	**148 JL**	**19.9 JL**	**12.4 JL**
Iron	**25200**	**11900**	**17800**	**3460**	**5660**	**7270**
Lead	**183**	**280**	**4360**	**4240**	**632**	**202**
Magnesium	**17900**	**116000**	**83400**	**15700**	**72000**	**90700**
Manganese	**1370**	**193**	**184**	**54.8**	**153**	**183**
Mercury	0.06 JB (0.11 SQL)	**0.48**	**0.51**	0.58 JB	**0.17**	**0.35**
Nickel	**58.4**	2.8 JB	**10**	16.5 JB	5.3 JB	7.7 JB
Potassium	**11660**	28.3 JB	155 JB	483 JB	427 JB	577 JB
Selenium	**1.5 JL**	0.70 U	0.71 U	5.3 JB	1.2 JB	0.84 U
Silver	**6.7**	0.24 JB	1.1 JB	1.2 JB	0.23 U	0.28 JB
Sodium	377 JB	229 JB	561 JB	665 JB	166 JB	193 JB
Vanadium	**51.2**	**10.4**	9.7 JB	3.7 JB	6.9 JB	10.3 JB
Zinc	**835**	**10800**	**31300**	**51500**	**4240**	**6720**
Pesticide/PCBs (mg/kg)						
4,4'-DDT	3.5 U	3.4 U	3.6 U	15 U	4.8 U	4.5 U

Note: Bold type indicates sample concentration is above the detection limit.
Underlined type indicates the sample results is significant as defined in Section 5.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
CLP = Contract Laboratory Program.
DC = Deep Creek Mine.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
L = Low bias.
mg/kg = Milligrams per kilogram.
µg/kg = Micrograms per kilogram.
NU = Not utilized.
PCBs = Polychlorinated biphenyls.
Q = The result is estimated because it is below the Contract Required Detection Limit.
SS = Surface soil.
TAL = Target Analyte List
TP = Tailings pile.
U = The analyte was not detected. The associated numerical value is the contract required detection limit.
WP = Waste Rock Pile

STEVENS COUNTY, WASHINGTON Table 6-16 COPPER KING MINE SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS

EPA Sample ID		**01254156**	**01254157**
CLP Inorganic ID		**MJ0GE5**	**MJ0GE7**
CLP Organic ID		**NU**	**NU**
E & E Sample ID		**NU**	**NU**
Station Location		**CKWP01SS**	**CKWP02SS**
Sample Depth (inches)		**0-6**	**0-6**
Description	**Background**	**Waste Rock Pile**	
TAL Metals (mg/kg)			
Aluminum	**18100**	**308**	**476**
Arsenic	**68.2**	**4.3 JL**	2.2 JB
Barium	**548**	12.3 JB	34 JB
Cadmium	**7.8**	0.07 U	0.07 U
Calcium	**118000**	**16000**	958 JB
Chromium	**29.0**	1.1 JB	**2.6**
Cobalt	8.6 JB (63 SQL)	0.26 U	0.26 U
Copper	**55.2**	**559**	**1700**
Iron	**25200**	**367000**	**262000**
Lead	**183**	**24.3**	**27.6**

Magnesium	**17900**	**4360**	334 JB
Manganese	**1370**	**282**	**276**
Mercury	0.06 JB (0.11 SQL)	**0.12**	0.06 U
Nickel	**58.4**	0.36 U	0.58 JB
Potassium	**11660**	377 JB	336 JB
Selenium	**1.5 JL**	**15.1**	**18.9**
Silver	**6.7**	**6.2**	**8.5**
Thallium	1.4 U	**2.4**	**3.7**
Vanadium	**51.2**	3.0 JB	5.5 JB
Zinc	**835**	**668**	**31.0**

Note: Bold type indicates sample concentration is above the detection limit.

Underlined type indicates the sample results is significant as defined in Section 5.

Key

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
CK = Copper King Mine.
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
L = Low bias.
mg/kg = Milligrams per kilogram.
NU = Not utilized.
SS = Surface soil.
TAL = Target Analyte List.
U = The analyte was not detected. The associated numerical value is the contract required detection limit.
WP = Waste rock pile.

STEVENS COUNTY, WASHINGTON Table 6-17 COPPER KING MINE SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENT AND SITE INSPECTIONS

EPA Sample ID		**01254159**
CLP Inorganic ID		**MJ0GE8**
CLP Organic ID		**NU**
E & E Sample ID		**NU**
Station Location		**CKPP01SD**
Sample Depth (inches)		**0-8**
Description	**Background**	**PPE 1**
TAL Metals (mg/kg)		
Aluminum	**20200**	**5750**
Arsenic	**13.0**	**4.9 JL**
Barium	**450**	**1320**

Cadmium	**3.4**	0.88 JB
Calcium	**109000**	**149000**
Chromium	**32.3**	**6.5**
Cobalt	**11.9**	1.5 JB
Copper	**69.3**	**6.3**
Iron	**27900**	**17700**
Lead	**124**	**33.0**
Magnesium	**33500**	**86900**
Manganese	**673**	**456**
Nickel	**31.9**	5.9 JB
Potassium	**3920 JK**	858 JB
Vanadium	**47.4**	7.3 JB
Zinc	**239**	**318**

Note: Bold type indicates sample concentration is above the detection limit.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
CK = Copper King Mine.
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
mg/kg = Milligrams per kilogram.
PP = Probable point of entry.
PPE = Probable point of entry.
SD = Sediment.
TAL = Target Analyte List.

Table 6-18

SIERRA ZINC MINE/MILL
SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENT AND S
STEVENS COUNTY, WASHINGTON

EPA Sample ID		01254299	01254300	01254301	01254302	01254303	01254304	
CLP Inorganic ID		MJ0ET3	MJ0ET4	MJ0ET5	MJ0ET6	MJ0ET7	MJ0ET8	
CLP Organic ID		J0ET3	NU	J0ET5	NU	NU	NU	
E & E Sample ID		J0ET4	NU	NU	NU	NU	NU	
Station Location		SZWP01SS	SZWP02SS	SZWP03SS	SZWP04SS	SZWP05SS	SZWP06SS	S
Sample Depth (inches) Description	Background	0-6	0-6	0-6	0-6	0-6	0-6	
		Waste Rock Pile						
TAL Metals (mg/kg)								
Aluminum	18100	5260	6570	4040	788	846	495	
Arsenic	68.2	6.4 JH	53.7 JH	12.5 JH	9.6 JH	9.2 JH	5.0 JH	
Barium	548	32.0 JB	64.7	27.0 JB	13.9 JB	8.0 JB	6.3 JB	
Cadmium	7.8	21.7	65.1	121	15.8	15.9	13.9	

Calcium	118000	17300	53000	72900	152000	156000	157000
Chromium	29.0	7.2	8.1	5.5	1.9 JB	2.2	3.1
Cobalt	8.6 JB (63 SQL)	3.0 JB	2.9 JB	3.1 JB	0.57 JB	0.24 U	0.28 JB
Copper	55.2	55.7 JH	130 JH	181 JH	53.9 JH	40.1 JH	61.6 JH
Iron	25200	14200	35400	28300	17500	19600	9820
Lead	183	1460	6570	15800	918	1380	871
Magnesium	17900	5810	26000	38900	95100	98900	100000
Manganese	1370	1150	2730	1850	441	437	462
Mercury	0.06 JB (0.11 SQL)	0.10 JB	1.6 JL	0.68 JL	0.18 JL	0.23 JL	0.10 JB
Nickel	58.4	6.1 JB	10	9.9	6.3 JB	7.0 JB	4.6 JB
Potassium	11660	1110 JL	845 JB	768 JB	349 JB	117 JB	108 JB
Selenium	1.5 JL	0.71 UJK	0.74 UJK	0.73 UJK	0.73 UJK	0.75 UJK	0.74 UJK
Silver	6.7	2.2	5.8	5.8	0.61 JB	0.58 JB	0.28 JB
Vanadium	51.2	12.7	12.4	10.4 JB	6.5 JB	5.8 JB	5.6 JB
Zinc	835	4980	14600	32200	4100	4330	3990

Table 6-18

SIERRA ZINC MINE/MILL
SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS
STEVENS COUNTY, WASHINGTON

EPA Sample ID		01254308	01254309	01254310	01254277	01254278	01254279
CLP Inorganic ID		MJ0EW2	MJ0EW3	MJ0EW4	MJ0ER1	MJ0ER2	MJ0ER3
CLP Organic ID		NU	NU	NU	NU	NU	NU
E & E Sample ID		NU	NU	NU	NU	NU	NU
Station Location		SZWP10SS	SZWP11SS	SZWP12SS	SZTP01SS	SZTP02SS	SZTP03SS
Sample Depth (inches)	Description	0-6	0-6	0-6	0-6	0-6	0-6
	Background	Waste Rock Pile			Tailings		
TAL Metals (mg/kg)							
Aluminum	18100	814	1240	5210	2650	173	298
Arsenic	68.2	9.7 JH	7.0 JH	8.7 JH	7.0	6.4	5.6
Barium	548	46.5	32.8 JB	53.2	195	5.4 JB	7.8 JB
Cadmium	7.8	30.5	29.6	27.2	68.1	23.4	14.4
Calcium	118000	139000	148000	98600	134000	168000	178000
Chromium	29.0	3.3	3.8	4.8	9.7	0.84 JB	1.3 JB
Cobalt	8.6 JB (63 SQL)	0.63 JB	0.67 JB	1.7 JB	1.6 JB	0.23 U	0.28 U
Copper	55.2	74.5 JH	144 JH	72.6 JH	370	28.8	33.4
Iron	25200	21000	15200	18200	15700 JK	17900 JK	10600 JK
Lead	183	1960	1710	1970	2830	488	2110
Magnesium	17900	86700	91200	60400	77000	105000	105000
Manganese	1370	527	548	483	414	255	265
Mercury	0.06 JB (0.11 SQL)	0.57 JL	0.40 JL	0.38 JL	1.7 JL	0.10 JB	0.24 JL
Nickel	58.4	8.7 JB	7.1 JB	8.7 JB	18.7	4.8 JB	3.5 JB
Potassium	11660	250 JB	232 JB	529 JB	943 JB	64.9 JB	91.3 JB
Selenium	1.5 JL	0.78 UJK	0.78 UJK	0.78 UJK	0.84 U	0.71 U	0.88 U
Silver	6.7	3.2	2.3 JB	2.6	9.3	0.63 JB	0.34 JB

Vanadium	51.2	8.2 JB	8.4 JB	10 JB	24.0	6.2 JB	8.5 JB
Zinc	835	7030	7530	6770	17600 JK	6860 JK	3560 JK

Table 6-18

SIERRA ZINC MINE/MILL
SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AI
STEVENS COUNTY, WASHINGTON

EPA Sample ID		01254283	01254284	01254285	01254286	01254287	01254288
CLP Inorganic ID		MJ0ER7	MJ0ER8	MJ0ER9	MJ0ES0	MJ0ES1	MJ0ES2
CLP Organic ID		NU	NU	NU	NU	NU	NU
E & E Sample ID		NU	NU	NU	NU	NU	NU
Station Location		SZTP07SS	SZTP08SS	SZTP09SS	SZTP10SS	SZTP11SS	SZTP12SS
Sample Depth (inches) Description	Background	0-6	0-6	0-6	0-6	0-6	0-6
		Tailings Pile					
TAL Metals (mg/kg)							
Aluminum	18100	214	365	1120	14500	5650	8960
Arsenic	68.2	6.5	6.2	8.2	5.8	4.5	3.4
Barium	548	6.8 JB	6.0 JB	37.4 JB	206	73.3	137
Cadmium	7.8	23.2	23.6	45.8	18.3	14.6	18.8
Calcium	118000	161000	160000	153000	53100	82100	39500
Chromium	29.0	1.5 JB	1.6 JB	4.5	8.7	5.6	9.2
Cobalt	8.6 JB (63 SQL)	0.27 U	0.28 U	0.38 JB	3.2 JB	2.0 JB	3.6 JB
Copper	55.2	50.7	69.5	146	97.7	63.4	104
Iron	25200	13000 JK	12300 JK	15400 JK	14500 JK	12100 JK	12500 JK
Lead	183	1670	1830	3210	1110	1020	917
Magnesium	17900	83100	81000	87200	28700	47900	21500
Manganese	1370	202	191	320	478	264	328
Mercury	0.06 JB (0.11 SQL)	0.36 JL	0.33 JL	0.57 JL	0.26 JL	0.21 JL	0.14 JB
Nickel	58.4	5.7 JB	5.0 JB	8.0 JB	11.0	7.6 JB	12.2
Potassium	11660	59.3 JB	65.7 JB	174 JB	800 JB	699 JB	1060 JB
Selenium	1.5 JL	0.82 U	0.85 U	0.86 U	0.87 U	0.80 U	1.0 U
Silver	6.7	0.62 JB	0.71 JB	1.6 JB	1.8 JB	0.92 JB	2.1 JB
Vanadium	51.2	5.3 JB	5.9 JB	10.5 JB	22.5	15.7	21.5
Zinc	835	7220 JK	5340 JK	10100 JK	4410 JK	3730 JK	4880 JK

STEVENS COUNTY, WASHINGTON Table 6-18 SIERRA ZINC MINE/MILL SURFACE SOIL SAM
ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PRELIMI
ASSESSMENTS AND SITE INSPECTIONS

EPA Sample ID	Background	01254292	01254293	01254294	01254295	01254296	01254297
CLP Inorganic ID		MJ0ES6	MJ0ES7	MJ0ES8	MJ0ES9	MJ0ET0	MJ0ET1
CLP Organic ID		NU	NU	NU	NU	NU	NU
E & E Sample ID		NU	NU	NU	NU	NU	NU

Station Location		SZTP16SS	SZTP17SS	SZTP18SS	SZTP19SS	SZTP20SS	SZTP21SS
Sample Depth (inches) Description		0-6	0-6	0-6	0-6	0-6	0-6
		Tailings Pile					
TAL Metals (mg/kg)							
Aluminum	**18100**	**383**	**494**	**408**	**714**	**319**	743
Arsenic	**68.2**	**6.5**	**6.7 JH**	**6.6 JH**	**7.2 JH**	**7.0 JH**	**5.8 JH**
Barium	**548**	9.2 JB	11.1 JB	14.6 JB	17.0 JB	5.2 JB	11.0 JB
Cadmium	**7.8**	**44.7**	**44.9**	**46.0**	**54.7**	**46.1**	70.0
Calcium	**118000**	**159000**	**156000**	**154000**	**149000**	**158000**	143000
Chromium	**29.0**	**2.9**	**2.9**	**2.9**	**4.4**	**2.6**	**4.9**
Cobalt	8.6 JB (63 SQL)	0.28 U	0.28 U	0.3 JB	0.42 JB	0.28 U	0.30 U
Copper	**55.2**	**162**	**163 JH**	**180 JH**	**222 JH**	**147 JH**	**297 JH**
Iron	**25200**	**10900 JK**	**10600**	**11800**	**14600**	**10200**	**13500**
Lead	**183**	**3370**	**3280**	**3980**	**4050**	**2940**	**5110**
Magnesium	**17900**	**90200**	**87800**	**89300**	**77600**	**89300**	**69500**
Manganese	**1370**	**301**	**284**	**258**	**569**	**236**	**629**
Mercury	0.06 JB (0.11 SQL)	**0.60 JL**	**0.65 JL**	**0.62 JL**	**0.68 JL**	**0.76 JL**	**0.77 JL**
Nickel	**58.4**	6.0 JB	5.5 JB	6.0 JB	8.2 JB	5.5 JB	7.8 JB
Potassium	**11660**	96.6 JB	108 JB	107 JB	216 JB	79.8 JB	208 JB
Selenium	**1.5 JL**	0.85 U	0.87 UJK	0.85 UJK	0.90 UJK	0.87 UJK	0.92 UJK
Silver	**6.7**	1.5 JB	1.8 JB	1.8 JB	**3.1**	1.3 JB	**2.8**
Vanadium	**51.2**	7.2 JB	7.6 JB	7.7 JB	10.5 JB	7.6 JB	12.6 JB
Zinc	**835**	**10800 JK**	**9700**	**9930**	**12300**	**10300**	**14700**

Note: Bold type indicates sample concentration is above the detection limit.
Underlined type indicates the sample results is significant as defined in Section 5.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
H = High bias.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
mg/kg = Milligrams per kilogram.
MS = Mill soil.
NU = Not utilized.
SS = Surface soil.
SZ = Sierra Zinc Mine/Mill.
TAL = Target Analyte List.
TP = Tailings pile.
U = The analyte was not detected. The associated numerical value is the contract required detection limit.
WP = Waste Rock Pile

Table 6-19

ELECTRIC POINT MINE/MILL
SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS
PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS
STEVENS COUNTY, WASHINGTON

EPA Sample ID		01254185	01254186	01254187	01254191	01254192	0125
CLP Inorganic ID		MJ0GH4	MJ0GH5	MJ0GH6	MJ0GJ0	MJ0GJ1	MJ0
CLP Organic ID		NU	NU	NU	NU	NU	N
E & E Sample ID		NU	NU	NU	NU	NU	N
Station Location		EPWP01SS	EPWP02SS	EPWP03SS	EPWP04SS	EPWP05SS	EPT
Sample Depth (inches)		0-6	0-6	0-6	0-6	0-6	0
Description	Background	Waste Rock Pile					
TAL Metals (mg/kg)							
Aluminum	18100	1740 JL	1680 JL	978 JL	4180 JL	2520 JL	3150
Arsenic	68.2	9.4 JH	9.4 JH	9.0 JH	27.7 JH	12.6 JH	19.6
Barium	548	12.9 JB	14.2 JB	11.7 JB	12.3 JB	12.1 JB	11.1
Beryllium	0.89 JB (1.06 SQL)	0.29 JB	0.30 JB	0.36 JB	1.1	0.51 JB	0.81
Cadmium	7.8	7.6 JL	8.0 JL	6.5 JL	17.2 JL	10.5 JL	13.0
Calcium	118000	144000 JL	146000 JL	143000 JL	42400 JL	77100 JL	6760
Chromium	29.0	5.0 JL	4.9 JL	8.2 JL	12.9 JL	7.8 JL	10.4
Cobalt	8.6 JB (63 SQL)	1.3 JB	1.4 JB	1.5 JB	2.3 JB	2.5 JB	2.1
Copper	55.2	7.3 JL	8.3 JL	7.5 JL	18.0 JL	9.8 JL	14.4
Iron	25200	26500 JL	28000 JL	30700 JL	140000 JL	57600 JL	1110
Lead	183	8110	14000	4490	50100	29300	26
Magnesium	17900	94900 JL	95800 JL	94300 JL	26700 JL	49000 JL	4230
Manganese	1370	753 JL	794 JL	871 JL	1540 JL	857 JL	85
Mercury	0.06 JB (0.11 SQL)	0.28	0.42	0.45	0.31	0.20	0.
Nickel	58.4	8.6 JL	8.9 JL	14.0 JL	34.0 JL	19.0 JL	25.0
Potassium	11660	101 JB	91.7 JB	53.9 JB	88.9 JB	83.0 JB	85.1
Selenium	1.5 JL	R	R	R	R	R	
Silver	6.7	0.32 JB	0.24 JB	0.31 JB	2.3	1.3 JB	1.7
Thallium	1.4 U	1.7 JB	1.1 JB	1.9 JB	10.1	3.7	7
Vanadium	51.2	19.4 JL	17.6 JL	23.1 JL	30.6 JL	17.5 JL	25.7
Zinc	835	2000 JK	2360 JK	1180 JK	33800 JK	13300 JK	12000

PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS Table 6-19
ELECTRIC POINT MINE/MILL SURFACE SOIL SAMPLES
ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS STEVENS COUNTY, WASHINGTON

EPA Sample ID		01254188	01254189	01254190
CLP Inorganic ID		MJ0GH7	MJ0GH8	MJ0GH9
CLP Organic ID		NU	NU	NU
E & E Sample ID		NU	NU	NU
Station Location		EPMS01SS	EPMS03SS	EPMS04SS
Sample Depth (inches)		0-6	0-6	0-6
Description	Background	Mill Soil		
TAL Metals (mg/kg)				
Aluminum	18100	2940 JL	2590 JL	2920 JL
Arsenic	68.2	26.1 JH	21.7 JH	13.7 JH
Barium	548	19.6 JB	18.5 JB	17.4 JB
Beryllium	0.89 JB (1.06 SQL)	1.1	1.1 JB	0.56 JB
Cadmium	7.8	6.8 JL	5.4 JL	6.4 JL
Calcium	118000	45900 JL	62000 JL	86800 JL
Chromium	29.0	11.3 JL	5.4 JL	11.2 JL
Cobalt	8.6 JB (63 SQL)	1.5 JB	0.75 JB	2.7 JB
Copper	55.2	17.1 JL	13.7 JL	10.5 JL
Iron	25200	113000 JL	88400 JL	61700 JL
Lead	183	94500	11200	97800
Magnesium	17900	28400 JL	38500 JL	51500 JL
Manganese	1370	1510 JL	1430 JL	1170 JL
Mercury	0.06 JB (0.11 SQL)	0.27	0.16	0.16
Nickel	58.4	18.9 JL	15.5 JL	14.7 JL
Potassium	11660	113 JB	92.0 JB	154 JB
Selenium	1.5 JL	R	R	R
Silver	6.7	2.2 JB	1.5 JB	1.5 JB
Thallium	1.4 U	7.5	6.3	3.3
Vanadium	51.2	50.2 JL	39.3 JL	26.6 JL
Zinc	835	5850 JK	10600 JK	5080 JK

Note: Bold type indicates sample concentration is above the detection limit.
Underlined type indicates the sample results is significant as defined in Section 5.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EP = Electric Point Mine/Mill.
EPA = United States Environmental Protection Agency.
H = High bias.
ID = Identification.

J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
mg/kg = Milligrams per kilogram.
MS = Mill soil.
NU = Not utilized.
R = The data are unusable for all purposes.
SQL = Sample quantitation limit.
SS = Surface soil.
TAL = Target Analyte List.
TP = Tailings pile.
U = The analyte was not detected. The associated numerical value is the contract required detection limit.
WP = Waste Rock Pile.

Table 6-20

GLADSTONE MINE/MILL
SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS
PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS
STEVENS COUNTY, WASHINGTON

EPA Sample ID		01254179	01254180	01254181	01254182	01254183	01254184
CLP Inorganic ID		MJ0GG8	MJ0GG9	MJ0GH0	MJ0GH1	MJ0GH2	MJ0GH3
CLP Organic ID		NU	NU	NU	NU	NU	NU
E & E Sample ID		NU	NU	NU	NU	NU	NU
Location ID		GLTP01SS	GLTP02SS	GLTP03SS	GLMS01SS	GLMS02SS	GLMS03SS
Sample Depth (inches) Description	Background	0-6 Tailings Pile	0-6 Tailings Pile	0-6 Tailings Pile	0-6 Mill Soil	0-6 Mill Soil	0-6 Mill Soil
TAL Metals (mg/kg)							
Aluminum	18100	2370 JL	2660 JL	4270 JL	4410 JL	3600 JL	5950 JL
Antimony	1.5 JB (15.1 SQL)	17.7 JL	8.7 JB	3.9 JB	1.3 JB	2.1 JB	1.2 JB
Arsenic	68.2	65.4 JH	55.9 JH	41.3 JH	21.6 JH	19.8 JH	22.4 JH
Barium	548	9.7 JB	14.0 JB	33.9 JB	29.3 JB	20.3 JB	45.9
Beryllium	0.48 JB (6.3 SQL)	2.1	2.7	1.7	1.2	1.2 JB	1.4
Cadmium	7.8	14.9 JL	9.2 JL	7.7 JL	6.4 JL	7.9 JL	5.4 JL
Calcium	118000	2250 JL	2920 JL	60300 JL	55800 JL	48200 JL	52900 JL
Chromium	29.0	11.8 JL	11.3 JL	8.5 JL	7.5 JL	8.1 JL	7.6 JL
Cobalt	8.6 JB (63 SQL)	0.29 U	0.28 U	1.0 JB	1.9 JB	1.5 JB	2.4 JB
Copper	55.2	47.2 JL	38.6 JL	23.9 JL	15.6 JL	16.1 JL	17.0 JL
Iron	25200	367000 JL	247000 JL	153000 JL	86300 JL	84800 JL	82600 JL
Lead	183	94000	90400	27100	35200	20300	22600
Magnesium	17900	1150 JB	1600 JL	36400 JL	33700 JL	29000 JL	32500 JL
Manganese	1370	2510 JL	3180 JL	2210 JL	2050 JL	1910 JL	1880 JL
Mercury	0.06 JB (0.11 SQL)	0.28	0.30	0.19	0.25	0.20	0.11 JB
Nickel	58.4	28.6 JL	28.3 JL	22.5 JL	18.6 JL	18.4 JL	19.2 JL
Potassium	11660	75.9 JB	124 JB	221 JB	215 JB	305 JB	491 JB
Selenium	1.5 JL	R	R	R	R	R	R

Silver	6.7	6.2	5.3	1.9 JB	1.6 JB	1.6 JB	1.5 JB
Thallium	1.4 U	23.5	21.2	11.3	6.0	7.4	4.6
Vanadium	51.2	78.7 JL	73.5 JL	57.2 JL	48.3 JL	46.6 JL	48.0 JL
Zinc	835	10500 JK	9880 JK	6560 JK	6370 JK	6790 JK	6020 JK

Note: Bold type indicates sample concentration is above the detection limit.
Underlined type indicates the sample results is significant as defined in Section 5. Page 1 of 2

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
GL = Gladstone Mine/Mill.
H = High bias.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
mg/kg = Milligrams per kilogram.
MS = Mill soil.
NU = Not utilized.
R = The data are unusable for all purposes.
SQL = sample quantitation limit.
SS = Surface soil.
TAL = Target Analyte List.
TP = Tailings pile.
U = The analyte was not detected. The associated numerical value is the contract required detection limit.

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Table 6-21 RED TOP MINE SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS STEVENS COUNTY, WASHINGTON PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS

EPA Sample ID		**01254153**	**01254154**	**01254155**
CLP Inorganic ID		**MJ0GE2**	**MJ0GE3**	**MJ0GE4**
CLP Organic ID		**NU**	**NU**	**NU**
E & E Sample ID		**NU**	**NU**	**NU**
Location ID		**RDWP01SS**	**RDWP02SS**	**RDWP03SS**
Sample Depth (inches) Description	**Background**	**0-6**	**0-6**	**0-6**
		Waste Rock Pile		
TAL Metals (mg/kg)				
Aluminum	**18100**	**947**	**1920**	**6780**
Antimony	1.5 JB (15.1 SQL)	**1930**	**81.7**	**183**
Arsenic	**68.2**	**142 JL**	**155 JL**	**69.6 JL**

Barium	**548**	41.0 JB	41.7 JB	201
Cadmium	**7.8**	**177 JH**	**111 JH**	**124 JH**
Calcium	**118000**	**239000**	**128000**	**176000**
Chromium	**29.0**	**4.4**	**8.3**	**42.2**
Cobalt	8.6 JB (63 SQL)	4.3 JB	2.4 JB	9.0 JB
Copper	**55.2**	**1080**	**145**	**225**
Iron	**25200**	**15000**	**55900**	**21800**
Lead	**183**	**28900**	**14600**	**14700**
Magnesium	**17900**	**10700**	**14600**	**21300**
Manganese	**1370**	**9700**	**14000**	**14800**
Mercury	0.06 JB (0.11 SQL)	**1.1**	**0.81**	**0.40**
Nickel	**58.4**	7.6 JB	**11.1**	**43.4**
Potassium	**11660**	363 JB	478 JB	**2890**
Selenium	**1.5 JL**	0.73 U	1.9	0.71 U
Silver	**6.7**	**58.4**	**30.4**	**20.2**
Vanadium	**51.2**	2.1 JB	7.0 JB	**22.8**
Zinc	**835**	**15600**	**15700**	**10700**

Note: Bold type indicates sample concentration is above the detection limit. Underlined type indicates the sample results is significant as defined in Section 5.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.

EPA = United States Environmental Protection Agency.
H = High bias.
ID = Identification

J = The analyte was positively identified. The associated numerical value is an estimate.

= Low bias. mg/kg = Milligrams per kilogram.
NU = Not utilized. RD = Red Top Mine. SS = Surface soil. TAL = Target Analyte List. U = The analyte was not detected. The associated numerical value is the contract required detection limit. WP = Waste Rock Pile.

Table 6-22 ANDERSON CALHOUN MINE/MILL SURFACE SOIL SAMPLES ANALYTICAL RESULT SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SI INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	**01374189**	**01374170**	**01374171**	**01374172**	**01374168**	**01374169**	**01374179**	**01374**
CLP Inorganic ID	**MJ0KK7**	**MJ0KH9**	**MJ0KJ0**	**MJ0KJ1**	**MJ0KH7**	**MJ0KH8**	**MJ0KJ8**	**MJ0K**
CLP Inorganic ID	**NU**	**NU**	**NU**	**NU**	**J0KH1**	**J0KH2**	**J0KH6**	**J0KI**
Station Location ID	**ANBK02SS**	**ANTP01SS**	**ANTP02SS**	**ANTP03SS**	**ANSS01SS**	**ANSS02SS**	**ANSS03SS**	**ANSS0**
Sample Depth (inches)	**0-6**	**0-6**	**0-6**	**0-6**	**0-6**	**0-6**	**0-6**	**0-6**

Description	Background	Tailings Pile			Stained Soil			
TAL Metals (mg/kg)								
Aluminum	**16400**	**3890**	**4030**	**4180**	**1780**	**2520**	749	92
Arsenic	**8.3 JL**	**11.4**	**7.1**	**6.9**	**8.7**	**17.4**	5.2	5.0
Barium	**470**	**117000**	**115000**	**122000**	**3330**	**5350**	83600	978
Cadmium	**3.4**	**6.0**	**4.7**	**4.3**	**124**	**129**	2.9	3.2
Calcium	**8210 JK**	**70500**	**60400**	**59200**	**109000**	**75000**	30600	365
Chromium	**15.6**	**46.8**	**34.1**	**30.9**	**12.5**	**76.5**	**18.3**	21.
Cobalt	6.0 JB (10.9 SQL)	**14.2**	**13.4**	**14.1**	**28.3**	**34.8**	10.2 JB	12.
Copper	**11.8**	**55.0**	**41.6**	**39.2**	**73.8**	**115**	**31.0**	30.
Iron	**19600**	**5780**	**3290**	**2740**	**12600**	**21400**	**2090**	199
Lead	**152**	**33.3 JK**	**15.5 JK**	**11.2 JK**	**2130**	**2190**	**381 JK**	25.8
Magnesium	**4160**	**12500**	**5110**	**4130**	**68600**	**42400**	**2200**	289
Manganese	**922**	**80.2**	**46.0**	**43.8**	**203**	**220**	**30.3**	30.
Mercury	0.05 U	**0.19**	**0.13**	**0.12**	**0.18**	**0.35**	0.06 JB	0.06
Nickel	**14.4**	**90.4**	**71.8**	**67.3**	**12.7**	**24.5**	**47.5**	5.3
Potassium	**1160**	297 JB	237 JB	233 JB	238 JB	355 JB	170 JB	186
Selenium	0.74 U	**4.9 JL**	**4.0 JL**	**3.8 JL**	**1.4 JL**	**2.9 JL**	**2.8 JL**	3.5 J
Silver	1.3 JB (2.2 SQL)	0.69 U	0.64 U	0.64 U	**12.0**	**14.8**	0.64 U	0.64
Vanadium	**27.4**	**270**	**183**	**172**	**10.6**	**21.7**	**94.1**	11
Zinc	**835**	**770**	**534**	**457**	**44900**	**49000**	**318**	33

Note: Bold type indicates sample concentration is above the detection limit.

Underlined type indicates the sample results is significant as defined in Section 5.

Key:

AN = Anderson Calhoun Mine/Mill.

B = The reported concentration is between the instrument detection limit and the contract required detection limit.

BK = Background.

CLP = Contract Laboratory Program.

E & E = Ecology and Environment, Inc.

EPA = United States Environmental Protection Agency.

ID = Identification.

J = The analyte was positively identified. The associated numerical value is an estimate.

K = Unknown bias.

L = Low bias.

mg/kg = Milligrams per kilogram.

NU = Not utilized.

SQL = Sample quantitation limit.

SS = Surface soil.

SS = Stained soil.

TAL = Target Analyte List.

TP = Tailings pile.

U = The analyte was not detected. The associated numerical value is the contract required detection limit.

Table 6-23

ANDERSON CALHOUN MINE/MILL
SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY
UPPER COLUMBIA RIVER MINES AND MILLS
PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS
STEVENS COUNTY, WASHINGTON

EPA Sample ID	01374181	01374173	01374174	01374175	01374178
CLP Inorganic ID	MJ0KJ5	MJ0KJ2	MJ0KJ3	MJ0KJ4	MJ0KJ7
CLP Organic ID	J0KH3	NU	NU	NU	J0KH5
E & E Sample ID	01090427	NU	NU	NU	01090429
Station Location ID	ANBK01SD	ANTP04SD	ANTP05SD	ANTP06SD	ANPP01SD
Sample Depth (inches)	0-6	0-6	0-6	0-6	0-6
Description	Background	Tailings Pile			PPE 1
TAL Metals (mg/kg)					
Aluminum	4070	3620	1810	1720	7580
Arsenic	2.7 JB (3.3 SQL)	10.0	4.3	6.9	6.8 JB
Barium	101	15400	3980	9080	348 JK
Cadmium	1.2 JB (1.7 SQL)	6.4	4.7	7.5	4.1 JB
Calcium	109000	74000	93500	107000	91300 JK
Chromium	9.9	55.5	11.1	10	20.8 JK
Cobalt	2.6 JB (16.7 SQL)	18.7	0.98 U	1.3 JB	6.9 JB
Copper	6.9 B (8.3 SQL)	67.4	30.7	49.4	23.2 JK
Iron	9200	3960	11300	17500	16600 JK
Lead	15.3 JK	12.3 JK	317 JK	320 JK	30.4 JK
Magnesium	3780	5840	59800	65300	5660 JK
Manganese	239	67	186	204	370 JK
Mercury	0.08 U	0.17	0.08 U	0.11 U	R
Nickel	10.8 JB (13.4 SQL)	106	15.5	18.4	25.1 JB
Selenium	1.4 JB (1.7 SQL)	6.7 JL	0.6 JB	1.1 JB	10.2 JK
Vanadium	15.9 JB (16.7 SQL)	294	16.7	22	19.4 JB
Zinc	76.3	723	2150	3250	343 JK

Note: *Bold type indicates sample concentration is above the detection limit. Underlined type indicates the sample results is significant as defined in Section 5.*

Key:

AN = Anderson Calhoun Mine/Mill.
B = The reported concentration is between the instrument detection limit and the contract required detection limit.
BK = Background.
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.

= Low bias. mg/kg = Milligrams per kilogram. µg/kg = Micrograms per kilogram. NU = Not utilized. PPE = Probable point of entry.
R = The data are unusable for all purposes. SD = Sediment. SQL = Sample quantitation limit. TAL = Target Analyte List. TP = Tailings pile. U = The analyte was not detected. The associated numerical value is the contract required detection limit.

STEVENS COUNTY, WASHINGTON Table 6-24 IROQUOIS MINE SURFACE SOIL SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS

EPA Sample ID		**01254358**	**01254359**
CLP Inorganic ID		**MJ0FJ7**	**MJ0FJ8**
CLP Organic ID		**NU**	**NU**
E & E Sample ID		**NU**	**NU**
Location ID		**IRWP01SS**	**IRWP02SS**
Sample Depth (inches)		**0-6**	**0-6**
Description	**Background**	**Waste Rock Pile**	
TAL Metals (mg/kg)			
Aluminum	**18100**	**2300**	**1080**
Antimony	1.5 JB (15.1 SQL)	1.3 JB	1.3 JB
Arsenic	**68.2**	**10.8**	**10.5**
Barium	**548**	37.5 JB	13.1 JB
Cadmium	**7.8**	**39.1**	**33.2**
Calcium	**118000**	**161000**	**155000**
Chromium	**29.0**	**3.6**	**2.1**
Cobalt	8.6 JB (63 SQL)	1.5 JB	0.62 JB
Copper	**55.2**	**7.4 JL**	**5.2 JL**
Iron	**25200**	**7140**	**7930**
Lead	**183**	**277**	**358**
Magnesium	**17900**	**107000**	**104000**
Manganese	**1370**	**277**	**232**
Mercury	0.06 JB (0.11 SQL)	**0.49**	**0.25**
Nickel	**58.4**	5.6 JB	4.7 JB
Potassium	**11660**	360 JB	145 JB
Selenium	**1.5 JL**	0.72 U	1.4
Silver	**6.7**	0.40 JB	0.55 JB
Vanadium	**51.2**	**12.9**	**12.6**
Zinc	**835**	**12300**	**10000**

Note: Bold type indicates sample concentration is above the detection limit.

Underlined type indicates the sample results is significant as defined in Section 5.

Key

B = The reported concentration is between the instrument detection limit and the contract required detection limit
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.
IR = Iroquois Mine.
J = The analyte was positively identified. The associated numerical value is an estimate.
L = Low bias.
mg/kg = Milligrams per kilogram.
NU = Not utilized.
SS = Surface soil.
TAL = Target Analyte List.
U = The analyte was not detected. The associated numerical value is the contract required detection limit.
WP = Waste Rock Pile

STEVENS COUNTY, WASHINGTON Table 6-25 MELROSE MINE SEDIMENT SAMPLE ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS

EPA Sample ID		**012541551**
CLP Inorganic ID		**MJ0GE0**
CLP Organic ID		**NU**
E & E Sample ID		**NU**
Location ID		**MLPP01SD**
Sample Depth (inches)		**0-8**
Sample Description	**Background**	**PPE 1**
TAL Metals (mg/kg)		
Aluminum	**20200**	**4690**
Arsenic	**13.0**	**25.5 JL**
Barium	**450**	**142**
Cadmium	**3.4**	**22.8 JH**
Calcium	**109000**	**81300**
Chromium	**32.3**	**16.1**
Cobalt	**11.9**	4.4 JB
Copper	**69.3**	**38.2**
Iron	**27900**	**11900**
Lead	**124**	**25.8**
Magnesium	**33500**	**4340**
Manganese	**673**	**216**
Nickel	**31.9**	**77.2**
Potassium	**3920 JK**	606 JB
Vanadium	**47.4**	**32.0**
Zinc	**239**	**1650**

Note: Bold type indicates sample concentration is above the detection limit.

Underlined type indicates the sample results is significant as defined in Section 5

Key:

B	= The reported concentration is between the instrument detection limit and the contract required detection limit.
CLP	= Contract Laboratory Program.
E & E	= Ecology and Environment, Inc.
EPA	= United States Environmental Protection Agency.
H	= High bias.
ID	= Identification.
J	= The analyte was positively identified. The associated numerical value is an estimate.
K	= Unknown bias.
L	= Low bias.
mg/kg	= Milligrams per kilogram.
µγ/κγ	= Micrograms per kilogram.
ML	= Melrose Mine.
NU	= Not utilized.
PCBs	= Polychlorinated biphenyls.
PPE	= Probable point of entry.
SD	= Sediment.
TAL	= Target Analyte List.
PP	= Probable point of entry.

7. EPA CLP ANALYTICAL RESULTS, SURFACE WATER MIGRATION/EXPOSURE PATHWAYS, AND TARGETS

The following sub-sections describe the surface water migration pathways for the 18 mines/mills that were sampled, tributaries that were sampled, potential targets within the range of influence of these mines/mills (Figures 7-1 through 7-18), and a discussion of sample results evaluated in accordance with criteria described in Section 5.1. Analytical data forms from laboratory analyses are provided in Appendix D.

With the exception of the LeRoi/Northport Smelter and Deep Creek Mine, an evaluation of the groundwater migration, soil exposure, and air migration pathways for all mine/mill sites sampled was not conducted as part of this investigation. Additional to an evaluation of the surface water migration pathway, an evaluation of the soil exposure pathway also was conducted as part of the investigations at the LeRoi/Northport Smelter and Deep Creek Mine.

Refer to Table 7-1 for a list of PPEs for those sampled mines/mills that contained a PPE.

7.1 DAISY MINE

7.1.1 Surface Water Pathway Description

The potential source areas at the Daisy Mine include a tailings pile measuring approximately

150 feet at the base, 30 feet in height with a slope of approximately 35%, and a depth of approximately 45 feet, and a shaft. T he shaft measured 10 feet by 10 feet by unknown depth. A wet area originating from the shaft extended south approximately 25 feet. From this source area, it is approximately another 70 feet overland to Magee Creek (PPE 1; Figure 6-1).

From the source area, drainage flows overland approximately 50 feet to the PPE in a ditch. T he surface water target distance limit (T DL) continues approximately 0.08 mile in the ditch to an unnamed tributary. T he unnamed tributary empties to Magee Creek 2.95 miles downstream. Magee Creek empties into the Columbia River another 2.18 miles downstream. T he surface water T DL concludes 9.79 miles downstream in the Columbia River.

T he unnamed tributary is assumed to be a minimal stream with flow rates less than 10 cfs. Magee Creek is assumed to be a small to moderate stream with flow rates between 10 cfs and 100 cfs. Columbia River at the U.S.-Canada border is 116,500 cfs (USGS 2002).

T he average annual precipit at ion is 17.20 inches in Colville, Washington (WRCC 2002). T he 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA 1973).

Soils in the area of Daisy Mine were mapped as Dehart-Rock outcrop complex, 40 to 65 percent slopes on side slopes and foothills. T he Dehart soil is very deep and somewhat excessively drained. T he permeabilit y of the soil is moderat ely rapid, and the available wat er capacity is low. Runoff is very rapid, and the hazard of water erosion is very high. (USDA 1982)

Approximately 279 upgradient acres of land is expected to drain through the source area at the mine (USGS 1985). T he drainage area of sources is approximately 1 acre (USGS 1985).

T he Daisy Mine does not lie in a flood plain (FEMA 1990).

No containment features such as runoff controls exist at the property.

7.2 L-BAR/NO RTHWEST MAGNESITE

7.2.1 Surface Water Pathway Description

T he potential source areas at L-Bar/Northwest Magnesite include an above-grade magnesite residue pile, approximately 30 feet deep and 17 acres in area, and inadequate

storage of flux bar and flux bar residue. T he magnesite pile is adjacent to the Main Ditch which flows into the Colville River approximately 1,000 feet north of the confluence of the magnesite pile and the Main Ditch (Figure 6-1).

For the magnesite and flux bar residue pile, the PPE is located in the West Ditch. T he overland distance between the source area and the West Ditch is less than 50 feet. T he West Ditch flows approximately 0.32 mile to t he confluence with the Colville River. T he surface water T DL concludes
14.68 miles downstream in the Colville River. T he magnesit e and flux bar residue pile also used to drain through the Main Ditch, but a water retention system has been installed in the ditch to eliminate discharge t o the Colville River.

T he West Ditch is assumed to be a minimal stream with a flow rate less than 10 cfs. T he average annual flow rate of t he Colville River near Blue Creek is 110 cfs (USGS 2002). T he average annual precipit at ion is 17.20 inches in Colville, Washington (WRCC 2002). T he 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA 1973). Soils in the area of L-Bar/Nort hwest Magnesite were mapped as Colville silt loam, drained in bottom lands. T he Colville soil is very deep, artificially drained soil. T he permeabilit y of t he soil is
moderately slow, and the available water capacity is very high. Runoff is very slow, and there is no hazard of water erosion. (USDA 1982)

Approximately 200,000 upgradient acres of land is expected to drain through the source area at the mine (USGS 1984). T he drainage area of sources is approximately 16 acres (USGS 1984).

L-Bar/Northwest Magnesite lies within a 100-year flood plain (FEMA 1990). Containment features such as runoff controls exist at the property.

7.3 NO RTHWEST ALLO YS

7.3.1 Surface Water Pathway Description

T he potential source areas at Northwest Alloys include products and byproducts in the production of magnesium, silicon, and ferrosilicon. Waste products generat ed were either recycled, sold as product or thread, or buried on site. None of the wastes were regarded as hazardous under RCRA but were classified as regulated wastes under Ecology Dangerous Waste Regulations (E & E 1988). T here is no overland flow from

the site directly into the Colville River due to topography. A potential overland flow exists on the southern portion of the site. T he overland flow potentially flows through ditches into Stensgar Creek (PPE 1). Stensgar Creek flows into the Colville River (Figure 6-5).

T he average annual precipit at ion is 17.20 inches in Colville, Washington (WRCC 2002). T he 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA 1973).

Soils in the area of Northwest Alloys were mapped as Colville silt loam, drained; Donavan loam, 8 to 25 percent slopes; Hodgson silt loam, 3 to 15 percent slopes; Koerling fine sandy loam, 5 to 15 percent slopes; Martella silt loam, 0 to 5 percent slopes; Martella silt loam, 5 to 15 percent slopes; Rock outcrop-Donavan complex, 30 to 65 percent slopes; and Springdale gravelly sandy loam, 0 to 15 percent slopes. T he Colville silt loam, drained, is very deep, art ificially drained soil on bottom lands. T he permeabilit y of the soil is moderat ely slow, and the available wat er capacity is very high. Runoff is very slow, and there is no hazard of water erosion. T he Donavan loam, 8 to 25 percent slopes is very deep, well drained soil on toe slopes and foot slopes of foothills. T he permeabilit y of the soil is moderat e, and the available water capacity is high. Runoff is medium, and the hazard of water erosion is moderate. Hodgson silt loam, 3 to 15 percent slopes is very deep, moderately well drained soil on undulating terraces. T he permeabilit y of t he soil is moderately slow, and the available wat er capacity is very high. Runoff is slow, and the hazard of water erosion is slight to moderate. Koerling fine sandy loam, 5 to 15 percent slopes is very deep, moderately well drained soil on terraces. T he permeabilit y of t he soil is moderate, and the available water capacity is very high. Runoff is medium, and the hazard of water erosion is moderat e. Martella silt loam, 0 t o 15 percent slopes is very deep, moderat ely well drained soil on terraces. T he permeabilit y of t he soil is moderately slow, and the available water capacity is very high. Runoff is slow, and the hazard of water erosion is slight to moderate. Martella silt loam, 5 to 15 percent slopes is very deep, moderately well drained soil on undulating terraces. T he permeability of the soil is moderately slow, and the available water capacity is very high. Runoff is medium, and the hazard of water erosion is moderate. Rock outcrop-Donavan complex, 30 to 65 percent slopes are on side slopes and foot hills. T he permeability of t he soil is moderate, and t he available water capacit y is high. Runoff is very rapid, and the hazard of water erosion is very high. Springdale gravelly

sandy loam, 0 to 15 percent slopes is very deep, somewhat excessively drained soil on terraces. T he permeability of the soil is moderately rapid to the layer of extremely cobbly coarse sand. T he available water capacity is low. Runoff is slow, and the hazard of water erosion is slight. (USDA 1982)

From the site, drainage enters a ditch, at PPE 1 for the surface water pathway. T he ditch flows an estimated 0.33 mile before entering Stensgar Creek. T he surface water T DL continues 0.79 mile in Stensgar Creek to t he Colville River. T he surface water T DL concludes 13.88 miles downstream in the Colville River.

Stensgar Creek and the ditch are assumed to be minimal streams with flow rates less than 10 cfs. T he average annual flow rat e of the Colville River at Blue Creek is 110 cfs (USGS 2002). Approximately 100,000 upgradient acres of land is expected to drain through the source area at the mine. T he drainage area of sources is approximately 79 acres. (USGS 1984) Northwest Alloys lies within a 100-year flood plain (FEMA 1990). Containment features such as runoff controls exist at the property.

7.4 NAPO LEO N MINE/MILL

7.4.1 Surface Water Pathway Description

T he pot ential source areas at t he Napoleon Mine/Mill include an adit measuring 5 feet by 4 feet locat ed sout h of the dirt road ent rance. T he adit discharge flows across the dirt road, down t he hillside approximately 120 feet before entering an intermittent creek (PPE 1; Figure 6-7). T he surface water T DL continues 0.73 mile in the intermittent creek to Kettle River. Kettle River empties into the Columbia River another 4.39 miles downstream. T he surface water T DL concludes 9.88 miles downst ream in the Columbia River.

T he intermittent creek is assumed to be a minimal stream with a flow rate less than 10 cfs. Kettle River is assumed to be a small to moderate stream with an average flow rate between 10 cfs and 100 cfs. Columbia River at the U.S.-Canada border has a flow rate of 116,500 cfs (USGS 2002).

T he average annual precipitation is 19.43 inches in Northport, Washington (WRCC 2002). T he 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA 1973).

Soils in the area of Napoleon Mine/Mill were mapped as Aits stony loam, 40 to 65 percent slopes. T he soil is very deep, well drained soil on side slopes and foothills. T he permeability of the soil is moderately slow, and the available water capacity is very high. Runoff is very rapid, and the hazard of water erosion is very high. (USDA 1982)

Approximately 525 upgradient acres of land are expected to drain through a source area at the mine (USGS 1969a). T he drainage area of sources is approximately 1 acre (USGS 1969a).

T he Napoleon Mine/Mill does not lie in a flood plain (FEMA 1990).

No containment features such as run off control exist at the property.

7.5 VAN STO NE MINE/MILL

7.5. Surface Water Pathway Description 1

T he potential source areas at the Van Stone Mine/Mill include waste rock storage area, two tailings piles, an open pit, buildings, and stained soil areas (Figures 6-9 through 6-11).

T he waste rock storage area was constructed by end dumping to the south contour from the open pit haul road. T he eastern toe of the waste rock storage area consists mostly of larges and is located less than 100 feet from the Northeast Fork of Onion Creek. Slopes on the north side of the haul road consist, in part, of colluvial overburden. Depth and quantity of overburden has yet to be determined. (Beacon 1999)

T he tailings embankments consist of steep sided erodable tailings sands. In some locations the slopes are heavily rilled, particulary along the south and west faces. (Beacon 1999)

A rock-lined spillway and discharge channel has been installed in the extreme northeast corner of the main tailings impoundment to direct any excess accumulated rainwater to the adjacent drainage. T ailings area water quality is monitored every 90 days and is reported to be suitable for discharge under the Water Discharge Permit or can be used for irrigation purposes.

A seepage pond is located adjacent to the tailings facility. T he open pit, located in the most southern portion of the area is flooded to an elevation of 3,510 feet or 170 feet above the

current pit bottom. T he rim of the open pit and portions of the top bench currently support vegetation. T he water in the open pit is separated from a tributary to the Northeast Fork of Onion Creek by a narrow rock-fill berm. T he water level in the open pit is static at 3,510 feet elevation and excess wat er seeps through this rock-fill t o the adjacent creek (PPE 3). (Beacon 1999)

Six areas of stained soil were noted on the property. T he first area was near a liquid propane tank south of the mill building. T he second area was near elevated t ransformers adjacent to the mill building. At this location, the soil was stained orange and green. T he third area was near an AST with secondary containment near the entrance t o the mine/mill. T he containment area was filled wit h water and smelled of diesel. No sheen was noted. T he secondary containment had been breached. T he fourth area was on a concrete pad with staged transformers and stained soil south of the liquid propane tank. T he fifth area was near staged 55-gallon drums surrounded by stained soil west of the mine/mill buildings and south of the Roundup Powder Company abandoned building. T he sixth area was near another AST area surrounded by stained soil located east of the shed and staged 55-gallon drums.

Several unnamed creeks were located adjacent to the property. One unnamed creek was located south of the mine pit water and could not be accessed due to safety concerns. A second unnamed creek was located at t he sout hwest portion of the old t ailings pile (PPE 4). A t hird unnamed creek was locat ed on Boise Cascade property; no sample was collected due to lack of access. A fourth unnamed creek was located adjacent to the tailings pile near t he ent rance to t he mine/mill (PPE 1 and PPE 2). Excess wat er from the on-site open pit seeps through the pit berm to an adjacent creek (PPE 3).

A number of public, private, and commercial interests access the mine/mill access road. Boise Cascade Forest District maintains an easement over the road to access their timber holdings. Washington Water Power maintains an easement over the road to access a substation located on the mine/mill property. T here are residences near the road junction and the DNR uses the road for fire control. (Beacon 1999)

For the waste rock and stained soil source areas, drainage flows overland approximately 800 feet to the PPE in an unnamed tributary. T he open pit is located immediately adjacent to this PPE. Excess water in the pit seeps through the rock berm to

the unnamed tributary. From the PPE, the surface water pathway T DL continues 2.17 miles in the unnamed tributary to the confluence with Onion Creek. Onion Creek empties into the Columbia River another 8.89 miles downstream. T he surface water T DL concludes 3.94 miles downstream in the Columbia River.

For t he t ailings pile source area, drainage flows overland approximately 950 feet to the PPE in an unnamed tributary. From the PPE, the surface water pathway T DL continues 0.90 mile to the confluence with Onion Creek. Onion Creek empties into the Columbia River another 8.89 miles downstream. T he surface water T DL concludes 5.21 miles downstream in the Columbia River.

For t he old tailings pile source area, drainage flows overland approximately 950 feet to the PPE in an unnamed tributary. From the PPE, the surface water pathway T DL continues 1.14 miles to the confluence with Onion Creek. Onion Creek empties into the Columbia River another 8.89 miles downstream. T he surface water T DL concludes 4.97 miles downstream in the Columbia River.

T he unnamed tributary is assumed to be a minimal stream with a flow rate less than 10 cfs. Onion Creek is assumed to be a small to moderate stream with flow rates between 10 cfs and 100 cfs. T he Columbia River (or Lake Roosevelt) has a flow rate of 116,500 cfs as measured at the U.S.-Canada border (USGS 2002).

T he average annual precipitation is 17.20 inches in Colville, Washington (WRCC 2002). T he 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA 1973).

Soils in the area of Van St one Mine/Mill were mapped as Merkel stony sandy loam, 40 to 65 percent slopes; Newbell silt loam, 25 to 40 percent slopes; Newbell stony silt loam, 0 to 40 percent slopes; and Newbell-Rock outcrop complex, 15 to 40 percent slopes. T he Merkel stony sandy loam, 40 to 65 percent slopes is very deep, moderately well drained soil on terrace escarpments. T he permeability of the soil is moderately slow, and the available wat er capacity is very high. Runoff is very rapid, and the hazard of water erosion is high. T he Newbell silt loam, 25 to 40 percent slopes is very deep, well drained soil on foot slopes of foot hills. T he permeabilit y of the soil is moderate, and the available water capacity is very high. Runoff is rapid, and the hazard of water erosion is high. T he Newbell stony silt loam, 0 to 40 percent slopes is very deep, well drained soil on toe slopes and foot slopes of foothills. T he permeabilit y of the soil is moderate, and t he available water capacity is very high. Runoff is rapid, and the hazard

of water erosion is high. T he Newbell-Rock outcrop complex, 25 to 40 percent slopes are on foot slopes of foothills. T he permeability of the soil is moderate, and t he available water capacity is very high. Runoff is rapid, and the hazard of water erosion is high. (USDA 1982)

Approximately 470 upgradient acres of land are expected to drain through a source area at the mine (USGS 1969b). T he drainage area for the waste rock pile at the site is estimated to be 16 acres (USGS 1969b).

T he Van Stone Mine/Mill does not lie in a flood plain (FEMA 1990).

Cont ainment features such as runoff control exist at the mine pit water at the mine/mill. At present, t he steep outer walls of the t ailings piles are subject t o surface erosion, as evidenced by the rills and gullies developed on the walls. A small berm has been made around t he tailings piles to contain eroded material and is effective in containing eroded material. T he owner is testing erosion control methods on t he t ailings pile walls. (Boise Cascade Corporat ion 1997)

7.6 LERO I/NO RTHPO RT SMELTER

7.6.1 Surface Water Pathway Description

T he potential source areas at the LeRoi/Northport Smelter include an area where slag bricks had been deposited south of the former smelter operations, and a potential former tailings area west of the slag brick area. T he former t ailings pile area was adjacent to a recently constructed ditch (PPE 1; Figure 6-16).

For t he t ailings pile, drainage enters a constructed dit ch, PPE 1 and PPE 2, for the surface water pathway. T he overland dist ance between t he t ailings pile and the ditch is estimated to be less than 100 feet for PPE 2. T he tailings pile extends into t he ditch at PPE 1. From the PPEs, the surface water T DL continues approximately 0.05 mile through the constructed ditch, which empties into the Columbia River. T he surface water T DL concludes 14.95 miles downstream in the Columbia River.

T he slag pile is located on the shore of the Columbia River (or Lake Roosevelt). T he source area extends into the Columbia River (PPE 3). From PPE 3 the surface water T DL concludes 15 miles downst ream in the Columbia River.

T he Columbia River (or Lake Roosevelt) has a flow rate of 116,500 cfs as measured at the U.S.-Canada border

(USGS 2002). T he average annual precipitation is 19.43 inches in Northport, Washington (WRCC 2002). T he 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA 1973).

Soils in the area of LeRoi/Northport Smelter were mapped as Hagen sandy loam, 0 to 15 percent slopes. T he soil is very deep, somewhat excessively drained soil on terraces. T he permeability of the soil is moderately rapid in the upper part and very rapid in the lower part. T he available water capacity is moderate. Runoff is slow. T he hazard of water erosion is slight to moderate, and the hazard of wind erosion is high. (USDA 1982)

Approximately one upgradient acre of land is expected to drain through the source area at the mine (USGS 1969c). T he drainage area of sources is approximately 33 acres (USGS 1969c). T he LeRoi/Northport Smelter lies within a 100-year flood plain (FEMA 1990). No containment features such as runoff control exist at the property.

7.6.2 Soil Exposure Pathway Description

A boat launch is located near the slag deposited along the bank of the Columbia River. No residents are located at the site. No school or day care facility is located within 200 feet of the site. T here are no worker's within 200 feet of any source on site. T he LeRoi/Northport Smelter is located within the city limits of Northport. Based on USGS topographic maps, the ST ART-2 assumes 336 people reside within a 1-mile travel distance from the site. No residents are located at the site. T he nearest residence is located 0.22 miles southwest from the site. No school or day care facility is located within 200 feet of the site. T here are no workers within 200 feet of any source on site. A city park is located approximately 50 feet from the north boundary of the site. T he park is accessed by means of a road on the southwest corner of the site. Access to the site is not restricted. Sources at the site are not fenced. No resources such as commercial agriculture, silviculture, or livestock production or grazing exist on a source area at the site. No wetlands are located on a source area at the site.

7.7 BLACK RO CK MINE/MILL

7.7.1 Surface Water Pathway Description

T he pot ential source areas at t he Black Rock Mine/Mill include a waste rock pile, shaft, remnant s of a mill building, and two sorting bins. No PPEs were identified by the ST ART-2 (Figure 6-19).

Although no PPEs exist at the site, the nearest surface water body is Deep Creek, located approximately 950 feet from the waste rock pile and collapsed mill source areas. From this location, t he surface water T DL continues 7.07 miles in Deep Creek to the confluence with the Columbia River. T he surface water pathway T DL concludes 7.93 miles downstream in the Columbia River.

T he average annual precipitation is 19.43 inches in Northport, Washington (WRCC 2002). T he 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA.1973).

Soils in the area of Black Rock Mine/Mill were mapped as Waits-Rock outcrop complex, 40 to 65 percent slopes. T he soils in this complex are very deep and well drained on side slopes of foothills. T he permeability of t he soil is moderate, and t he available water capacit y is very high. Runoff is very rapid, and the hazard of water erosion is very high. (USDA 1982)

Approximately 660 upgradient acres of land is expected to drain through the source area at the mine (USGS 1992a). T he drainage area of sources is approximately 7 acres (USGS 1992a).

T he Black Rock Mine/Mill does not lie in a flood plain (FEMA 1990).

No containment features such as runoff control exist at the property.

7.8 GREAT WESTERN MINE

7.8.1 Surface Water Pathway Description

T he potential source areas at the Great Western Mine include three waste rock piles, shaft systems, and adits. No PPEs were identified by the ST ART-2 (Figure 6-21).

Although, no PPEs exist at the site, the nearest surface water body is an unnamed tributary. From this location, the surface water T DL continues 0.13 mile in the unnamed tributary to the confluence with Deep Creek. Deep Creek empties into the Columbia River another 7.36 miles downstream. T he surface water pathway T DL concludes 7.51 miles downstream in the Columbia River.

T he average annual precipitation is 19.43 inches in Northport, Washington (WRCC 2002). T he 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0

inches (NOAA 1973).

Soils in the area of Great Western Mine were mapped as Waits-Rock outcrop complex, 40 to 65 percent slopes. T he soils in this complex are very deep and well drained on side slopes of foothills. T he permeability of t he soil is moderate, and t he available water capacit y is very high. Runoff is very rapid, and the hazard of water erosion is very high. (USDA 1982)

Approximately 400 upgradient acres of land is expected to drain through the source area at the

mine (USGS 1992a). T he drainage area of sources is approximately 29 acres (USGS 1992a). T he Great Western Mine does not lie in a flood plain (FEMA 1990). No containment features such as runoff control exist at the property.

7.9 LAST CHANCE MINE/MILL

7.9.1 Surface Water Pathway Description

T he pot ential source areas at t he Last Chance Mine/Mill include two waste rock piles, t ailings pile, shaft, adit, and a seep (Figure 6-23).

T he larger waste rock pile was located north of the north shaft and measured 1,320 feet by 75 feet by 2 feet deep. T he smaller waste rock pile located west of the north shaft measured 75 feet by 45 feet by unknown depth. A tailings pile surrounding a former house or office and mill building located west of the waste rock piles measured 600 feet by 105 feet by 3 feet deep. East of the waste rock piles and the abandoned road the ST ART-2 located north and south shafts and an adit upgradient from the north shaft. A seep was located near the mouth of the south shaft which flows into the unnamed creek. Further east of the shafts, an unnamed creek was documented. T he adit discharge flowed into the unnamed creek (PPE 1) and cont inued west past the wast e rock piles, through the tailings pile (PPE 2) and infiltrated the ground prior to reaching the Colville-Alladin Northport Road. South of the point of infiltration, a drainage ditch and culvert were observed. T he potential flow from the culvert travels by sheet flow into Deep Creek.

For the three source areas at the site, the PPEs are located in an unnamed tributary that flows through the site. From the this location, the surface water T DL continues 0.56 mile in the unnamed tributary to the confluence with Deep Creek. Deep Creek empties into the Columbia River 7.36 miles downstream. T he surface

water T DL concludes 7.08 miles downstream in the Columbia River.

T he unnamed tributary is assumed to be a minimal stream with a flow rate less than 10 cfs. Deep Creek has an average annual flow rate of 96.0 cfs near Northport. T he Columbia River (or Lake Roosevelt) has a flow rate of 116,500 cfs as measured at the U.S.-Canada border. (USGS 2002)

T he average annual precipitation is 19.43 inches in Northport, Washington (WRCC 2002). T he 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA 1973).

Soils in the area of Last Chance Mine/Mill were mapped as Wait s-Rock out crop complex, 40 t o 65 percent slopes. T he soils in this complex are very deep and well drained on side slopes of foothills. T he permeability of t he soil is moderate, and t he available water capacit y is very high. Runoff is very rapid, and the hazard of water erosion is very high. (USDA 1982)

Approximately 550 upgradient acres of land is expected to drain through the source area at the mine (USGS 1992a). T he drainage area of sources is approximately 12 acres (USGS 1992a).

T he Last Chance Mine/Mill does not lie in a flood plain (FEMA 1990).

No containment features such as runoff control exist at the property.

7.10 DEEP CREEK MINE

7.10.1 Surface Water Pathway Description

T he pot ential source areas at t he Deep Creek Mine include four wast e rock piles, tailings, adit , shaft, garbage and debris pile, and buildings containing transformers (Figure 6-25).

T he waste rock pile located adjacent to Deep Creek measured 20 feet by 20 feet by 5 feet deep. T here could be potential overland flow from the waste rock pile to Deep Creek (PPE 1). T he flow of Deep Creek was estimated by the ST ART-2 at 100 cfs. T he waste rock pile located adjacent to the main road measured 60 feet by 20 feet by 10 feet deep. T he waste rock pile located west of the pad with power tower and fence measured 100 feet by 30 feet by 10 feet deep. T he waste rock pile located near the adit measured 40 feet by 20 feet by 5 feet deep. T he roads on the mine property were comprised of waste rock. T he entrance road measured 700 feet by 20 feet by 2 feet deep. T he road heading south to the adit measured 400 feet by 15 feet by 2 feet deep and also

consisted of tailings. T ailings were found scattered throughout the mine area. Concentrated areas were located in two wet areas (one on the south end of the property near the adit measuring 15 feet by 15 feet and one south of the main entrance road measuring 30 feet by 30 feet) and north and west of the waste rock pile adjacent to the entrance road. A swampy area was located south of the gated entrance and measured 150 feet by 100 feet. T here could be potential flow from this area to Deep Creek (PPE 2). T he pad with power tower and fence measured 25 feet by 40 feet. A garbage and debris pile was located adjacent to the main road and measured 50 feet by 20 feet by 5 feet deep. West of the garbage and debris pile was an assay building measuring 20 feet by 20 feet. Further west and north four buildings were identified. Building 1 measured 50 feet by 40 feet and contained a winch and four small transformers. Building 2 measured 100 feet by 45 feet and contained two small transformers, motor and pumps, and a foundation. Building 3 measured 40 feet by 40 feet. Building 4 measured 30 feet by 30 feet. Other features on the south end of the property include a concrete pad, a shaft, and a pond. T he concrete pad measured 15 feet by 20 feet. T he adit measured 4 feet by 3 feet by unknown depth. T he adit was not flowing; however, standing water was present. T he shaft measured 5 feet by 5 feet by approximately 800 feet deep. T he pond measured 20 feet by 20 feet by 5 feet deep.

For the waste rock piles, the nearest PPE is located at Deep Creek, approximately 50 feet overland from a source area. T he surface water T DL begins in Deep Creek and continues for 7.7 miles until Deep Creek empties into the Columbia River. T he surface water T DL concludes 7.3 miles downst ream in t he Columbia River.

For t he t ailings piles and adit , the nearest PPE is locat ed at Deep Creek, approximately 175 feet overland from a source area. T he surface water T DL begins in Deep Creek and continues for 7.7 miles until Deep Creek empties into the Columbia River. T he surface water T DL concludes 7.3 miles downst ream in t he Columbia River.

Deep Creek has an average annual flow rate of 96.0 cfs near Northport. T he Columbia River (or Lake Roosevelt) has a flow rate of 116,500 cfs as measured at the U.S.-Canada border. (USGS 2002) T he average annual precipitation is 19.43 inches in Northport, Washington (WRCC 2002). T he 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA 1973).

Soils in the area of Deep Creek Mine were mapped as Rock outcrop-Maki complex, 30 to 65 percent slopes. T he soils in this complex are on side slopes of foothills. T he permeability of t he soil is moderate, and the available water capacity is low. Runoff is very rapid, and the hazard of water erosion is very high. (USDA 1982)

Approximately 170 upgradient acres of land is expected to drain through the source area at the mine (USGS 1992a). T he drainage area of sources is approximately 5 acres (USGS 1992a). T he Deep Creek Mine lies within a 100-year flood plain (FEMA 1990). No containment features such as runoff control exist at the property.

7.10.2 Soil Exposure Pathway Description

A residence is located to the east of the mine and outside of the gated area. T he average number of persons per household in Stevens County is 2.64 (USBC 2000). No school or day care facility is located within 200 feet of the site. T here are no worker's within 200 feet of any source on site. Based on USGS topographic maps, the ST ART-2 assumes no other population within a 1- mile travel distance from the site. No resources such as commercial agriculture, silviculture, or livestock production or grazing exist on a source area at the site. No wetlands are located on a source area at the site. Most sources at the site are not fenced.

7.11 COPPER KING MINE

7.11.1 Surface Water Pathway Description

T he potential source areas at the Copper King Mine include two waste rock piles, adits, and a shaft (Figure 6-27).

One waste rock pile was located east of Alladin Road and southwest of adit 1 and measured 60 feet by 30 feet by 3 feet deep. Adit 1 measured 5 feet by 10 feet. No flow or drainage was noted by the ST ART-2. Adit 2 was located east of adit 1 and measured 5 feet by 10 feet. Adit 2 drainage flowed approximately 75 feet southwest before infiltrating the ground. T here is a potential that during heavy flow adit 2 discharge could reach Deep Creek (PPE 1). A retention area was documented where the adit discharge infiltrates the ground measuring 5 feet by 1 feet by 1 feet deep. T he retention area was composed of small logs and plastic sheeting which was estimated to retain approximately 15 gallons. A hose was noted south of the retention area

extending southwest for approximately 20 feet. T o the east of adit 2 the ST ART-2 identified a second waste rock pile and shaft. T he waste rock pile measured 75 feet by 120 feet by 6 feet deep. T he shaft was surrounded by the waste rock and measured 15 feet by 20 feet by unknown depth. Standing water was noted.

For t he waste rock piles and adit 2, drainage will flow overland approximately 475 feet to the PPE at the South Fork of Deep Creek. T he surface water T DL begins in the South Fork of Deep Creek and continues for 4.1 miles until the South Fork of Deep Creek empties into Deep Creek. T he surface water T DL concludes 10.9 miles downstream in Deep Creek.

T he South Fork of Deep Creek is assumed to be a small to moderate stream with an average flow rate between 10 cfs and 100 cfs. Deep Creek has an average annual flow rate of 96.0 cfs near Northport (USGS 2002).

T he average annual precipitation is 17.20 inches in Colville, Washington (WRCC 2002). The 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA 1973).

Soil in the area of Copper King Mine was mapped as Aits stony loam, 40 to 65 percent slopes. T he soil is very deep, well drained soil on side slopes and foothills. T he permeability of the soil is moderately slow, and the available water capacity is very high. Runoff is very rapid, and the hazard of water erosion is very high. (USDA 1982)

Approximately 130 upgradient acres of land is expected to drain through the source area at the

mine (USGS 1992a). T he drainage area of sources is approximately 3 acres (USGS 1992a). T he Copper King Mine lies within a 100-year flood plain (FEMA 1990). No containment features such as runoff control exist at the property.

7.12 SIERRA ZINC MINE/MILL

7.12.1 Surface Water Pathway Description

T he potential source areas at the Sierra Zinc Mine/Mill include one waste rock pile, tailings pile, mill building, an adit, and areas of contaminated soil (Figure 6-29).

T he mine/mill area contained one waste rock pile measuring 100 feet by 50 feet by 5 feet deep. North of the waste rock pile was a tailings pile measuring 1,000 feet by 2,100 feet by an estimated 20 feet deep. T here could be potential overland flow from the tailings pile to the drainage ditch (PPE 1). T he flow of the drainage ditch was estimated by the ST ART-2 to be approximately 0.5 cfs. A mill building was located south of the waste rock and tailings piles

measuring 250 feet by 225 feet. Northwest of the mill building an adit was located measuring 2 feet by 2 feet by unknown depth. T he discharge was estimated by the ST ART-2 at approximately 0.5 gpm. T he adit water flowed north into the forested area. T hree residences were located south of the property.

For the contaminated soil near the waste rock pile, drainage flows overland approximately 750 feet to the PPE in a ditch. T he ditch flows approximately 0.30 mile to the South Fork of Deep Creek. T he surface water T DL continues 4.67 miles in the South Fork of Deep Creek to the confluence with Deep Creek. T he surface water T DL concludes 10.03 miles downstream in Deep Creek.

For t he t ailings pile, drainage flows overland approximately 350 feet to the PPE in the ditch. T he ditch flows approximately 0.30 mile to the South Fork of Deep Creek. T he surface water T DL continues
4.67 miles in the South Fork of Deep Creek to the confluence with Deep Creek. T he surface water T DL concludes 10.03 miles downstream in Deep Creek.

For t he contaminated soil near the mill building, drainage flows overland approximately 1,350 feet to the PPE in the ditch. T he ditch flows approximately 0.30 mile to the South Fork of Deep Creek. T he surface water T DL continues 4.67 miles in the South Fork of Deep Creek to the confluence with Deep Creek. T he surface water T DL concludes 10.03 miles downstream in Deep Creek.

For the adit, drainage flows north into a forested area. A PPE from this source to surface water was not identified.

T he ditch is assumed to be an intermittent minimal stream with a flow rate less than 10 cfs. T he South Fork of Deep Creek is assumed to be a small to moderate stream with a flow rate between 10 cfs and 100 cfs. T he average annual flow rate of Deep Creek near Northport is 96.0 cfs (USGS 2002).

T he average annual precipitation is 17.20 inches in Colville, Washington (WRCC 2002). T he 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA 1973).

Soils in the area of Sierra Zinc Mine/Mill were mapped as Aits loam, 25 to 40 percent slopes; Aits stony loam, 40 to 65 percent slopes; Aits-Rock outcrop complex, 0 to 40 percent slopes; Bridgeson silt loam; Eloika very stony silt loam, 25 to 40 percent slopes; Martella silt

loam, 0 to 5 percent slopes; Martella silt loam, 5 to 15 percent slopes; and Newbell-Rock outcrop complex, 40 to 65 percent slopes. Aits loam, 25 to 40 percent slopes are very deep, well drained soil on foot slopes of foot hills. T he permeability of the soil is moderately slow, and the available wat er capacity is very high. Runoff is rapid, and the hazard of water erosion is high. Aits stony loam. 40 to 65 percent slopes is very deep, well drained soil on side slopes of foothills. T he permeabilit y of the soil is moderately slow, and the available water capacity is very high. Runoff is very rapid. and the hazard of water erosion is very high. Aits-Rock out crop complex, 0 to 40 percent are on toe slopes and foot slopes of foot hills. T he permeability of the soil is moderately slow, and the available wat er capacity is very high. Runoff is rapid, and the hazard of water erosion is high. Bridgeson silt loam is very deep, poorly drained soil on bottom lands and low stream terraces. T he permeabilit y of the soil is moderately slow, and t he available water capacity is very high. Runoff is very slow. T his soil is subject to occasional flooding for long periods from February to April. Eloika very stony silt loam, 25 to 40 percent slopes are deep. well drained soil on terrace escarpments. T he permeabilit y of the soil is moderat e, and the available water capacity is high. Runoff is rapid, and the hazard of water erosion is high. Martella silt loam, 0 to 5 percent slopes is very deep, moderately well drained soil on terraces. T he permeabilit y of t he soil is moderately slow, and the available water capacity is very high. Runoff is slow, and the hazard of water erosion is slight t o moderat e. Martella silt loam, 5 to 15 percent slopes is very deep, moderately well drained soil on undulating terraces. T he permeabilit y of t he soil is moderately slow, and the available water capacity is very high. Runoff is medium. and the hazard of water erosion is moderate. Newbell-Rock out crop complex, 40 t o 65 percent slopes are on side slopes of foot hills. T he permeability of the soil is moderate, and the available water capacity is very high. Runoff is very rapid, and the hazard of water erosion is very high. (USDA 1982)

Approximately 95 upgradient acres of land is expected to drain through the source area at the mine (USGS 1992a). T he drainage area of sources is approximately 36 acres (USGS 1992a). T he Sierra Zinc Mine/Mill does not lie in a flood plain (FEMA 1990). No containment features such as runoff control exist at the property.

7.13 ELECTRIC PO INT MINE/MILL

7.13.1 Surface Water Pathway Description

T he pot ential source areas at t he Elect ric Point Mine/Mill include two waste rock piles. two collapsed shafts, and collapsed mill building (Figure 6-31). No PPEs were

identified by the ST ART-2.

Although, no PPEs exist at the site, the nearest surface water body is an unnamed tributary. T he unnamed tributary flows 0.59 mile to the confluence with Republican Creek. Republican Creek empties into the North Fork of Deep Creek 2.65 miles downstream. T he surface water T DL continues 1.56 miles downstream in the North Fork of Deep Creek to the confluence with Deep Lake. Deep Lake outflows into the North Fork of Deep Creek 1.36 miles from the lake's intake. T he North Fork of Deep Creek empties into Deep Creek 2.68 miles downstream. T he surface water T DL concludes 6.16 miles downstream in Deep Creek.

T he average annual precipitation is 19.43 inches in Northport, Washington (WRCC 2002). T he 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA 1973).

Soils in the area of Electric Point Mine/Mill were mapped as Belzar-Rock outcrop complex, 40 to 65 percent slopes and Waits-Rock outcrop complex, 40 to 65 percent slopes. Belzar-Rock outcrop complex, 40 to 65 percent slopes are moderately deep and well drained on side slopes of foothills. T he permeabilit y of the soil is moderat e, and the available water capacity is moderate. Runoff is very rapid, and the hazard of water erosion is very high. Waits-Rock outcrop complex, 40 to 65 percent slopes are very deep and well drained on side slopes and foot hills. T he permeability of t he soil is moderate, and t he available water capacity is very high. Runoff is rapid, and the hazard of water erosion is very high. (USDA 1982)

Approximately 22 upgradient acres of land is expected to drain through the source area at the mine (USGS 1992b). T he drainage area of sources is approximately 20 acres (USGS 1992b).

T he Elect ric Point Mine/Mill does not lie in a flood plain (FEMA 1990).

No containment features such as runoff control exist at the property.

7.14 GLADSTO NE MINE/MILL

7.14.1 Surface Water Pathway Description

T he pot ential source areas at t he Gladstone Mine/Mill include one waste rock pile, shafts, tailings pile, and potential collapsed mill building (Figure 6-33). No PPEs were identified by the ST ART-2.

Although, no PPEs exist at the site, the nearest surface water body is an unnamed tributary. T he unnamed tributary flows 0.54 mile to the confluence with the West Fork of Silver Creek. T he West Fork of Silver Creek empties into Silver Creek 1.28 miles downstream. T he

surface water T DL continues 1.95 miles downstream in Silver Creek to the confluence with the North Fork of Deep Creek. T he North Fork of Deep Creek empties into Deep Lake 3.38 miles downstream. Deep Lake outflows into the North Fork of Deep Creek 1.36 miles from the lake's intake. T he North Fork of Deep Creek empties into Deep Creek 2.68 miles downstream. T he surface water T DL concludes 3.81 miles downstream in Deep Creek.

T he average annual precipitation is 19.43 inches in Northport, Washington (WRCC 2002). T he 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA 1973).

Soils in the area of Gladstone Mine/Mill were mapped as Wait s-Rock out crop complex, 40 t o 65 percent slopes. T he soils in this complex are very deep and well drained on side slopes of foothills. T he permeability of t he soil is moderate, and t he available water capacit y is very high. Runoff is very rapid, and the hazard of water erosion is very high. (USDA 1982)

Approximately 380 upgradient acres of land is expected to drain through the source area at the mine (USGS 1992b). T he drainage area of sources is approximately 1 acre (USGS 1992b).

T he Gladst one Mine/Mill does not lie in a flood plain (FEMA 1990).

No containment features such as runoff control exist at the property.

7.15 RED TO P MINE

7.15.1 Surface Water Pathway Description

T he potential source areas at the Red T op Mine includes a waste rock pile, portal/shaft, and adit (Figure 6-35). No PPEs were identified by the ST ART-2.

Although, no PPEs exist at the site, the nearest surface water body is an unnamed tributary. T he unnamed tributary flows 0.42 mile to the confluence with Hartbauer Creek. T he surface water T DL continues 1.54 miles in Hartbauer Creek to the confluence with the North Fork of Deep Creek. T he North Fork of Deep Creek empties into Deep Lake 4.21 miles downstream. Deep Lake outflows into the North Fork of Deep Creek 1.36 miles from the lake's intake. T he North Fork of Deep Creek empties into Deep Creek 2.68 miles downstream. T he surface water T DL concludes 4.79 miles downstream in Deep Creek.

T he average annual precipitation is 19.43 inches in Northport, Washington (WRCC 2002). T he 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA 1973).

Soils in the area of Red T op Mine were mapped as Ahren loam, 40 to 65 percent

slopes. T he soils are deep, well drained on side slopes of foothills. T he permeability of the soil is moderately slow, and the available water capacity is very high. Runoff is very rapid, and the hazard of water erosion is very high. (USDA 1982)

Approximately 440 upgradient acres of land is expected to drain through the source area at the mine (USGS 1992b). T he drainage area of sources is approximately 39 acres (USGS 1992b).

T he Red T op Mine does not lie in a flood plain (FEMA 1990).

No containment features such as runoff control exist at the property.

7.16 ANDERSO N CALHO UN MINE/MILL

7.16.1 Surface Water Pathway Description

T he potential source areas at the Anderson Calhoun Mine/Mill include a tailing pile, evaporation pond, waste rock pile, mine pit, mine building, floatation building, waste rock storage bin, mill building, scattered drums, scattered transformers, and stained soil areas (Figure 6-37).

T he mine/mill area consisted of a tailings pile measuring 555 feet by 500 feet by unknown depth. T he tailings pile was located adjacent to the gated entrance road and on the western portion of the property. A pond is located on the tailings pile. T o the north of the tailings pile, an evaporation pond was noted measuring 105 feet by 50 feet.

T o the east of the tailings pile a waste rock pile was locat ed underneath the wast e rock conveyor belt measuring 120 feet by 80 feet by 20 feet deep. T he waste rock conveyor belt was connected to the mine building, the floatation building, and the waste rock storage bin. T he mine building measured 25 feet in width by 15 feet in length by 20 feet in height. T he conveyor belt attached to the floatation building measured 35 feet in length. T he floatation building measured 25 feet in width by 15 feet in length by 10 feet in height. T he waste rock storage bin measured 15 feet in width by 15 feet in length by 40 feet in height.

T he mill building was located north of the mine building and measured 50 feet in widt h by 75 feet in lengt h by 40 feet in height. T he mill building contained staged reagent and unknown drums, floatation tanks, and a crusher. Approximately 100 55-gallon steel drums were staged in the east corner of t he mill building. Many of t hese unmarked drums were punctured

with bullet s wit h the cont ent s spilling onto t he concrete foundat ion. T he unknown spilled contents were solidified. T he concret e floor did not appear to be breached. T ailings were scatt ered throughout t he mill building. A portal measuring 10 feet by 10 feet was locat ed on t he western port ion of the mill building with a conveyor belt leading into t he building.

Remnants of a storage shed and two concrete pads were located in between the mine and mill buildings. T he storage shed foundation measured 20 feet by 20 feet. Remnants of " Cebar Barite", a white cellulose-type material, was scattered throughout the storage shed foundation and surrounding area including the concrete pads. Five 55-gallon drums were scattered on the storage shed foundation. One concrete pad measuring 40 feet by 10 feet was located directly east of the dilapidated storage shed. T en 55-gallon drums were staged on palettes. T here was no legible documentation on the drums. T he second concrete pad was located north of the first concrete pad and measured 10 feet by 20 feet. Scrap wood, steel, and garbage were scattered on both concrete pads.

On the north side of t he mill building, t hree areas of scatt ered drums intermixed with debris and equipment were documented. Stained soil with an oil odor were noted around the drums. Cattle prints were identified in the stained soil. T here was a distinct sheen throughout the stained soil area surrounding the drums.

T ransformers were identified in 6 areas. A substation, heavily vandalized, was also documented. T he first area was located east of the dilapidated storage shed and two concrete pads and consisted of a power line with three transformers. T he second area was located adjacent to the south side of the mill building and comprised three transformers staged on concrete pads. T he concrete was not compromised. T he third area was located west of the second area and consisted of a fallen power line with a

transformer. T he top of the transformer was detached and no staining was noted in the vicinity. T he fourth area was located north of the fallen power line and comprised a gated area containing a power line with transformer and 6 transformers staged on concrete. No staining was noted on the concrete or the surrounding soil. T he fifth area was located west of the fourth area and consisted of three transformers staged on a concrete pad. No staining was noted on the concrete or the surrounding soil. T he sixth area was located to the east of the fourth area and consisted of a power line with a transformer. T he substation was located south of the sixth area and east of the third area and consisted of a partially gated area with remnant

electrical equipment.

On the southern port ion of the propert y and east of the mine/mill entrance, a silo, concret e pad, and mine pit were located. T he mine pit was filled wit h water.

A stream flowing sout h ext ended t he ent ire length of the mine/mill and onto private farmland. A marshy wetland area was noted on the western portion of the stream and adjacent to the eastern side of the tailings pile and evaporation pond (PPE 1).

For t he t ailings pile source area, drainage flows overland approximately 100 feet to PPE 1. T he wetland drains 0.01 mile to an unnamed stream. T he unnamed stream empties into the North Fork of Deep Creek 0.11 mile downstream. T he surface water T DL continues 4.06 miles downstream in the North Fork of Deep Creek to the confluence with Deep Lake. Deep Lake outflows into the North Fork of Deep Creek 1.36 miles from the lake's intake. T he North Fork of Deep Creek empties into Deep Creek
2.68 miles downstream. T he surface water T DL concludes 6.78 miles downstream in Deep Creek.

For the contaminated soil source areas at the site, drainage flows overland approximately 250 feet to the PPE, located in the unnamed stream. T he unnamed stream empties into the North Fork of Deep Creek 0.11 mile downstream. T he surface water T DL continues 4.06 miles downstream in the North Fork of Deep Creek to the confluence with Deep Lake. Deep Lake outflows into the North Fork of Deep Creek 1.36 miles from the lake's intake. T he North Fork of Deep Creek empties into Deep Creek
2.68 miles downstream. T he surface water T DL concludes 6.79 miles downstream in Deep Creek.

For the mine pit, drainage flows overland approximately 200 feet to the PPE, located in an unnamed stream. T he unnamed stream empties into the North Fork of Deep Creek 0.2 mile downstream. T he surface water T DL continues 4.06 miles downstream in the North Fork of Deep Creek to the confluence with Deep Lake. Deep Lake outflows into the North Fork of Deep Creek 1.36 miles from the lake's intake. T he North Fork of Deep Creek empties into Deep Creek 2.68 miles downstream. T he surface water T DL concludes 6.7 miles downstream in Deep Creek.

T he unnamed stream is assumed to be a minimal stream with an average flow rate less

than 10 cfs. The North Fork of Deep Creek and Deep Lake are assumed to be small to moderate streams with average flow rates between 10 cfs and 100 cfs. The average flow rate of Deep Creek near Northport is 96.0 cfs (USGS 2002). The average annual precipitation is 19.43 inches in Northport, Washington (WRCC 2002). The 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA 1973).

Soils in the area of Anderson Calhoun Mine/Mill were mapped as Saltese muck, drained; Waits loam, 0 to 15 percent slopes; Waits loam, 40 to 65 percent slopes; and Waits-Rock outcrop complex, 40 to 65 percent slopes. Saltese muck, drained, are very deep, artificially drained, organic soil in basins and potholes on bottom lands and along the perimeters of lakes. The permeability of the soil is moderate, and the available water capacity is very high. Runoff is ponded. There is no hazard for soil erosion. Waits loam, 0 to 15 percent slopes are very deep, well drained on toe slopes of foothills. The permeability of the soil is moderate, and the available water capacity is very high. Runoff is slow, and the hazard of water erosion is slight to moderate. Waits loam, 40 to 65 percent slopes are very deep, well drained on side slopes of foothills. The permeability of the soil is moderate, and the available water capacity is very high. Runoff is very rapid, and the hazard for water erosion is very high. Waits-Rock outcrop complex, 40 to 65 percent slopes are very deep and well drained on side slopes of foothills. The permeability of the soil is moderate, and the available water capacity is very high. Runoff is very rapid, and the hazard of water erosion is very high. (USDA 1982)

Approximately 660 upgradient acres of land is expected to drain through the source area at the mine (USGS 1992b). The drainage area of sources is approximately 4 acres (USGS 1992b). The Anderson Calhoun Mine/Mill lies within a 100-year flood plain (FEMA 1990). No containment features such as runoff control exist at the property.

7.17 IROQUOIS MINE

7.17.1 Surface Water Pathway Description

The potential source areas at the Iroquois Mine include one waste rock pile and an adit (Figure 6-39). No PPEs were identified by the START-2.

Although no PPEs exist at the site, the nearest surface water body is an unnamed tributary. T he surface water T DL continues 0.69 mile in the unnamed tributary to Hartbauer Creek. Hartbauer Creek empties to the North Fork of Deep Creek 2.34 miles downstream. T he North Fork of Deep Creek empties into Deep Lake 4.21 miles downstream. Deep Lake outflows into the North Fork of Deep Creek

1.36 miles from the lake's intake. T he North Fork of Deep Creek empties into Deep Creek 2.68 miles downstream. T he surface water T DL concludes 3.72 miles downstream in Deep Creek. T he average annual precipitation is 19.43 inches in Northport, Washington (WRCC 2002). T he 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA 1973).

Soils in the area of Iroquois Mine were mapped as Belzar silt loam, 40 to 65 percent slopes. T he soils are moderately deep, well drained on side slopes of foothills. T he permeability of the soil is moderate, and the available water capacity is moderate. Runoff is very rapid, and the hazard of water erosion is very high. (USDA 1982)

Approximately 870 upgradient acres of land is expected to drain through the source area at the

mine (USGS 1992b). T he drainage area of sources is approximately 17 acres (USGS 1992b). T

he Iroquois Mine does not lie in a flood plain (FEMA 1990). No containment features such as runoff control exist at the property.

7.18 MELRO SE MINE

7.18.1 Surface Water Pathway Description

T he potential source area at the Melrose Mine includes an adit

T he mine area consisted of an adit 5 feet by 10 feet by unknown depth. Moss and algae growth were noted near the mouth of the adit. T he adit discharge flowed approximately 40 feet east to an unnamed tributary (PPE 1) that feeds into T om Bush Creek. T he ST ART-2 estimated the flow of the unnamed tributary at 1 gpm. T he surface water T DL continues for 0.1 mile in the unnamed tributary to the confluence with T om Bush Creek. T om Bush Creek empties into the Columbia River 1.74 miles downstream. T he surface water T DL concludes 13.16 miles downstream in the Columbia River.

T here were no waste rock piles; however, the entry road appeared to be constructed out of waste rock. A building approximately 10 feet by 10 feet by 10 feet was located to the north of the adit and contained test core samples.

T he average annual precipitation is 19.43 inches in Northport, Washington (WRCC 2002). T he 2-year, 24-hour rainfall event for the area ranges from 1.4 to 2.0 inches (NOAA 1973).

Soils in the area of Melrose Mine were mapped as Huckleberry silt loam, 15 to 25 percent slopes. T he soils are moderately deep, well drained on toe slopes and ridgetops of mountains. T he permeability of the soil is moderate, and the available water capacity is high. Runoff is medium, and the hazard of water erosion is moderate. (USDA 1982).

Approximately 260 upgradient acres of land is expected to drain through the source area at the mine (USGS 1992c). T he drainage area of sources is approximately 3 acres (USGS 1992c). T he Melrose Mine does not lie in a flood plain (FEMA 1990). No containment features such as runoff control exist at the mine.

7.19 TRIBUTARIES

T ributaries to the upper Columbia River sampled as part of this field effort include unnamed tributary Section 8, T ownship 32N, Range 37E; unnamed tributary at Clover Leaf Beach Campground; Stranger Creek (west); Hall Creek; Cobbs Creek; unnamed tributary Section 28, Range 37E, T ownship 33N; unnamed tributary Section 30, Range 37E, T ownship 33N; unproposed dry tributary; unnamed tributary Section 21, Range 37E, T ownship 33N; unnamed tributary Section 19, Range 37E, T ownship 33N; unnamed tributary Section 18, Range 37E, T ownship 33N; Magee Creek; Jennings Creek; Little Jim Creek; unnamed tributary Section 1, Range 37E, T ownship 33N; unnamed tributary Section 4, Range 37E, T ownship 33N; unnamed tributary Section 5, Range 37E, T ownship 33N; unnamed tributary Section 32, Range 37E, T ownship 34N; unnamed tributary Section 36, Range 36E, T ownship 34N; unnamed tributary Section 25, Range 36E, T ownship 34N; Cheweka Creek; unnamed tributary Section 29, Range 37E, T ownship 34N (north of Cheweka Creek); unnamed tributary Section 29, Range 37E, T ownship 34N (NW quarter); unnamed tributary Section 20, Range 37E, T ownship 34N; Barnaby Creek; Rotter Bay Creek; Quillisascut Creek; unnamed tributary Section 11, Range 36E, T ownship 34N; unnamed tributary Section 6, Range 37E, T ownship 34N; Cuba Canyon Creek; unnamed tributary Section 31, Range 37E; T ownship 35N; La Fleur Creek; unnamed tributary Section 32, Range 37E, T ownship 36N; unnamed tributary Section 33, Range 37E, T ownship

36N (SW quarter; drains Nettleton Lake); unnamed tributary Section 33, Range 37E, T ownship 35N (NW quarter); unproposed dry tributary; unnamed tributary Section 22, Range 37E, T ownship 35N (south of Bradbury campground); Martin Creek; unnamed tributary Section 15, Range 37E, T ownship 35N (north of Bradbury campground); Roper Creek; Rickey Creek; Cougar Canyon Creek; Hallam Creek; unnamed ephemeral tributary west of Mingo Creek; Mingo Creek; Colville River; Sherman Creek; unnamed tributary Section 22, Range 37E, T ownship 36N (SE quarter); unmapped tributary adjacent to T S051; unnamed tributary Section 22, Range 37E, T ownship 36N (NE quarter); unnamed tributary Section 15, Range 37E, T ownship 36N (SE quarter, western tributary); unnamed tributary Section 15, Range 37E, T ownship 36N (SE quarter, eastern tributary); unnamed tributary Section 14, Range 37E, T ownship 36N (SW quarter); unnamed ephemeral tributary Section 18, Range 38E, T ownship 36N (SW quarter); Martin Spring Creek; Pingston Creek; Nancy Creek; unnamed ephemeral tributary Section 33, Range 37E, T ownship 37N; unnamed tributary Section 16, Range 37E, T ownship 37N (SW quarter); unnamed ephemeral tributary Section 22, Range 37E, T ownship 37N; unnamed tributary across from Marcus Island Section 23, Range 37E, T ownship 37N; unnamed ephemeral tributary Section 28, Range 38E, T ownship 37N; unnamed ephemeral tributary Section 22, Range 38E, T ownship 37N (SW quarter); unnamed ephemeral tributary Section 22, Range 38E, T ownship 37N (NW quarter); unnamed spring drainage east of Evans Campground peninsula; Deadman Creek; unnamed ephemeral tributary Section 16, Range 37E, T ownship 37N (NW quarter); unnamed tributary to Kettle River Arm (drainage pond near Boyds); unnamed ephemeral tributary Section 9, Range 37E, T ownship 37N (NW quarter, SE quarter); unnamed ephemeral tributary Section 9, Range 37E, T ownship 37N (NW quarter, NE quarter); unnamed ephemeral tributary Section 4, Range 38E, T ownship 37N (NE quarter); Matsen Creek; Doyle Creek; Kettle River; China Creek; unnamed tributary south of Snag Cove; unnamed ephemeral tributary Section 36, Range 37E, T ownship 38N (SW quarter); unnamed ephemeral tributary entering river Section 35, Range 37E, T ownship 38N (NE quarter); unnamed tributary directly across from Bossburg, Washington; Dilly Lake ephemeral tributary; unnamed ephemeral tributary upstream of Dilly Lake ephemeral tributary; unnamed ephemeral tributary Section 21, Range 38E, T ownship 38N; unnamed ephemeral tributary Section 22, Range 38E, T ownship 38N; unnamed ephemeral tributary at North Gorge Campground; unnamed ephemeral tributary Section 17, Range 38E, T ownship 38N (NW quarter); unnamed ephemeral tributary downstream of Lodgepole Creek, Section 8, Range 38E, T ownship 38N (NW quarter); Lodgepole Creek; unnamed ephemeral tributary Section 10, Range 38E, T ownship 38N; Fifteenmile Creek;

unnamed ephemeral tributary at Flat Creek; Flat Creek; unnamed ephemeral tributary downstream of China Bar; unnamed ephemeral tributary Section 25, Range 39E, T ownship 39N (Sw quarter); Crown Creek; Rattlesnake Creek; unnamed ephemeral tributary downstream from Moses Spring Creek: Moses Spring Creek; Onion Creek; unnamed ephemeral tributary Section 10, Range 39E, T ownship 39N; Squaw Creek; unnamed tributary from nearshore ponds; Fivemile Creek; Bear Creek; Deep Creek; Big Sheep Creek; Quartz Creek; Goodeve Creek; Scriver Creek; unnamed tributary northeast of gaging station; tributary to T om Bush Creek and Melrose Mine; unnamed tributary to Onion Creek and Van Stone Mine/Mill; unnamed tributary to Onion Creek and Van Stone Mine/Mill; unnamed tributary to Onion Creek and Van Stone Mine/Mill; tributary to Deep Creek and Last Chance Mine/Mill; Deep Creek South Fork; unnamed tributary to Deep Creek; tributary to T om Bush Creek and Melrose Mine; unnamed tributary to Onion Creek and Van Stone Mine/Mill; and Deep Creek South Fork.

T he annual stream flow data for the available applicable stations in Stevens County include:

- 578 cfs for Colville River at Kettle Falls (USGS 2002);
- 28.0 cfs for Mill Creek at mouth of Colville (USGS 2002);
- 16.3 cfs for Haller Creek near Arden (USGS 2002);
- 62.2 cfs for Little Pend Oreille River near Colville (USGS 2002);
- 110 cfs for Colville River at Blue Creek (USGS 2002);
- 23.2 for Chewelah Creek at Chewelah (USGS 2002);
- 25.5 cfs for Deer Creek near Valley (USGS 2002);
- 13.0 cfs for Sheep Creek at Springdale (USGS 2002);
- 2.84 cfs for Sheep Creek at Loon Lake (USGS 2002);
- 341 cfs for Sheep Creek near Northport (USGS 2002);
- 74.1 cfs for Sheep Creek near Velvet (USGS 2002);
- 96.0 cfs for Deep Creek near Northport (USGS 2002); and
- 116,500 cfs for Columbia River at U.S.-Canada border (USGS 2002).

7.20 TARGETS

T his section discusses potential target information for the 18 mines that were sampled. T here are no schools or day-care facilities within 200 feet of the 18 mine/mill areas that were sampled.

Lake Roosevelt and the upper Columbia River are used for hydroelectric power, irrigation, and recreation. T he man-made Lake Roosevelt area provides opportunities for boating, fishing, swimming, camping, and hiking (http://www2.thingstodo.com/states/WA/nationalparks/lakeroosevelt.htm).

Surface water intakes are reported to lie within the surface water target distance limit (T DL) for each of the mines/mills sampled. T he average number of persons per household in

Stevens County is

2.64 (USBC 2000); therefore, the ST ART -2 estimates the following:

- T here are 5.28 persons using surface water from Magee Creek for drinking water within the 15-mile T DL of Daisy Mine;
- T here are 5.28 persons using surface water from the Colville River for drinking water within the 15-mile T DL of L-Bar/Northwest Magnesite;
- T here are no people using surface water for drinking water within the 15-mile T DL of Northwest Alloys;
- T here are 7.92 persons using surface water from the Kettle River and 16.08 persons using surface water from Lake Roosevelt for drinking water within the 15-mile T DL of Napoleon Mine/Mill;
- T here are 10.56 persons using surface water from Onion Creek for drinking water within the 15-mile T DL of Van Stone Mine/Mill;
- T here are 2.64 persons using surface water from Lake Roosevelt for drinking water within the 15-mile T DL of LeRoi/Northport Smelter;
- T here are 21.12 persons using surface water from Deep Creek for drinking water within the 15-mile T DL of Black Rock Mine/Mill;
- T here are 21.12 persons using surface water from Deep Creek for drinking water within the 15-mile T DL of Great Western Mine;
- T here are 21.12 persons using surface water from Deep Creek for drinking water within the 15-mile T DL of Last Chance Mine/Mill;
- T here are 21.12 persons using surface water from Deep Creek for drinking water within the 15-mile T DL of Deep Creek Mine;
- T here are 23.76 persons using surface water from Deep Creek for drinking water within the 15-mile T DL of Copper King Mine;
- T here are 23.76 persons using surface water from Deep Creek for drinking water within the 15-mile T DL of Sierra Zinc Mine/Mill;
- T here are 2.64 persons using surface water from Republican Creek for drinking water, 5.28 persons using surface water from Deep Creek for drinking water, and 15.84 persons using surface water from Deep Lake for drinking water within the 15-mile T DL of Electric Point Mine/Mill;
- T here are 21.12 persons using surface water from Silver Creek for drinking water, 5.28 persons using surface water from Deep Creek for drinking water, and 15.84 persons using surface water from Deep Lake for drinking water within the 15-mile T DL of Gladstone Mine/Mill;
- T here are 2.64 persons using surface water from Hartbauer Creek for drinking water, 5.28 persons using surface water from Deep Creek for drinking water, and 15.84 persons using surface water from Deep Lake for drinking water within the 15-mile T DL of Red T op Mine;
- T here are 15.84 persons using surface water from Deep Creek for drinking water and 15.84 persons using surface water from Deep Lake for drinking water within the 15-mile T DL of Anderson Calhoun Mine/Mill;
- T here are 2.64 persons using surface water from Hartbauer Creek for drinking water, 5.28 persons using surface water from Deep Creek for drinking water, and 15.84 persons using surface water from Deep Lake for drinking water within the 15-mile T DL of Iroquois Mine; and
- T here are 2.64 persons using surface water from T om Bush Creek for drinking water within the 15-mile T DL of Melrose Mine. (Ecology 2001a)

T he ST ART -2 expects that surface water will be used within the T DL for irrigation of commercial food or forage crops or for watering of commercial livestock.

Lake Roosevelt and its tributaries in the Lake Roosevelt National Recreation Area support a varied fish community that today is considerably different from the native fish community of the early 1900s. T he changes over time were caused by the introduction of nonnative species, habitat alterations such as water pollution, the damming of rivers, and reservoir drawdowns. T oday, there are possibly 28 native and 12 nonnative species of fish that inhabit recreation area waters. (DOI 2000)

Between 1990 and 1996 the number of angler trips to Lake Roosevelt ranged from 171,725 to 594,508 per year. Recreational fishing trips to Lake Roosevelt peaked in 1993 and have been declining since. T he decline was partly attributed to the dewatering of boat ramps during the 1996 drawdown that prohibited anglers from accessing much of the reservoir. Walleye, rainbow trout, and kokanee salmon were the fish most often caught and harvested by anglers. (DOI 2000) Data provided by the Lake Roosevelt Fisheries Evaluation Project; a cooperative project amongst the Spokane T ribe of Indians, the Colville Confederated T ribes, and the Washington Department of Fish and Wildlife; to the EPA indicates that over a ten week period from July 13, 2002 to September 20, 2002, 576 fish were caught by anglers from Lake Roosevelt. T hese fish consisted of 338 walleye, 221 rainbow trout, and 17 kokanee salmon. (Lee 2002) T he State of Washington only tracks sturgeon, salmon, and steelhead in its freshwater sport fishing data. T hey list that 4 sturgeon were harvested between Grand Coulee Dam and the Canadian border in 1998. No steelhead and salmon are reported (WSDFW 2001).

T he Spokane T ribe and the Colville Confederated T ribes, and the Washington Department of Fish and Wildlife are the primary agencies directly involved in managing the Lake Roosevelt fisheries. T he Spokane T ribe is coordinating the development of a Lake Roosevelt fisheries plan, funded by the Bonneville Power Administration in cooperation with the Washington Department of Fish and Wildlife, the Colville Confederated T ribes, and other involved parties. T wo kokanee salmon hatcheries are operated by the Spokane T ribe and the Washington Department of Fish and Wildlife to support the resident fishery in Lake Roosevelt. T he hatcheries produce thousands of kokanee for release into Lake Roosevelt annually. T he Spokane T ribe also has initiated a program of rearing rainbow trout at its hatchery for release into the lake. (DOI 2000)

In addition to the hatchery operations, there are numerous rainbow trout pens on Lake

Roosevelt. T hese fish-rearing pens provide thousands of trout annually to support the recreational fishery. T he success of this project in providing catchable-size rainbow trout resulted in its expansion to more than 30 net pens in several locations on Lake Roosevelt by 1995. In addition, some of the net pens are now being used to rear kokanee before release. (DOI 2000)

T he Lake Roosevelt National Recreation Area is present along the Columbia River from Grand Coulee Dam to nearly the U.S.-Canada border. Six species may inhabit areas in or near the Lake Roosevelt National Recreation Area that are protected by the Endangered Species Act. Of these, gray wolves (*Canus lupus*), peregrine falcons (*Falco peregrinus*), and woodland caribou (*Rangifer tarandus caribou*) were endangered, and the bald eagle (*Haliaeetus leucocephalus*), bull trout (*Salvelinus confluentus*), and grizzly bear (*Ursus arctos horribilis*) were threatened. T he Canada lynx (*Felis lynx canadensis*), a proposed species for listing, may also inhabit lands in or near the Lake Roosevelt National Recreation Area. T he Canada lynx is not currently protected under the Endangered Species Act. T he state of Washington also listed gray wolves, peregrine falcons, woodland caribou, and grizzly bears as endangered and the bald eagle and Canada lynx as threatened. (DOI 2000)

Peregrine nests have been found in the area surrounding the Lake Roosevelt reservoir. Use of the area by peregrines normally occurs during spring and fall migrations. Peregrine falcon foraging and nesting habitats are usually associated with tall cliffs near water. T heir diet consists primarily of waterfowl, shorebirds, and passerine species commonly found on and around lakes and streams. (DOI 2000)

No confirmed gray wolf sightings have been documented in the Lake Roosevelt National Recreation Area; however, numerous unconfirmed sightings have been reported in some surrounding areas in recent years. (DOI 2000)

Between 1987 and 1990, 60 woodland caribou were moved to northern Idaho from British Columbia to help bolster the existing remnant herd. T he herd has been augmented as recently as 1998. However, it is unlikely that woodland caribou would be found in the immediate vicinity of the Lake Roosevelt National Recreation Area. Woodland caribou are known to occur in northeastern Washington; however, none have been reported in the national recreation area. Most caribou remain in forested habitats year-round. (DOI 2000)

Bald eagles maintain a large overwintering population in the area surrounding the Lake Roosevelt reservoir from November through March annually. More than 21 bald eagle nests are in the vicinity and bald eagles appear to be becoming more productive each year. A maximum of 15 territories has been occupied in any one year. Bald eagle habitat is usually associated with

large bodies of water that provide an abundant source of food. (DOI 2000) Bald eagle habitat has been observed on the Columbia River/Lake Roosevelt wit hin the 15-mile T DLs of Napoleon Mine/Mill. Van Stone Mine/Mill, LeRoi/Northport Smelter, Black Rock Mine/Mill, Great Western Mine, Last Chance Mine/Mill, Deep Creek Mine, and Melrose Mine (WSDFW various dates).

Although grizzly bears occur in the Selkirk ecosystem in northern Idaho and Washington, population levels are believed to be low. No grizzly bears have been recently reported within the National Recreation Area. (DOI 2000)

Bull trout historically occupied a vast geographic area of the Columbia River. T oday the remaining populations are isolated and remnant. Native bull trout have declined significantly in the last 10 years, in part due to predation by and competition with introduced species such as walleye. If bull trout are present, Lake Roosevelt and its tributaries could provide suitable habitat. Bull trout typically migrate from lakes in the fall to spawn in clear streams with flat gradient, uniform flow, and uniform gravel or small cobble. (DOI 2000)

Lynx have been seen near the northern end of Lake Roosevelt; however, no evidence of resident populations have been documented. Lynx prefer the density of coniferous forests and swamp areas where their coloring allows them to be camouflaged from their prey. (DOI 2000)

In addition to the aforementioned, another 24 animal species of concern to the state of Washington or the United States Fish and Wildlife Service may occur in or near the Lake Roosevelt National Recreation Area. T hese include the threatened ferruginous hawk (*Buteo regalis*); the candidates California floater (*Anodonta californiensis*), Columbia sharp-tail grouse (*Tympanuchus phasianellus colum bians*), Columbia spotted frog (*Rana luteiventris*), loggerhead shrike (*Lanius ludovicianus*), northern goshawk (*Accipiter gentilis*), Pacific fisher (*Martes pennanti pacifica*), pale T ownsend's big-eared bat (*Corynorhinus townsendii pallexcens*), and Washingt on ground squirrel (*Spermophilus washingtoni*). (DOI 2000)

No federally-listed, proposed, or candidate plants are known to occur within the Lake Roosevelt National Recreation Area. (DOI 2000)

Lake Roosevelt is the largest single geographic feature in the northeastern corner of Washington state. T he surrounding countryside is mostly rural except for the small towns in the Kettle Falls and Grand Coulee Dam areas. T here are five counties and two Indian reservations that touch upon Lake Roosevelt National Recreation Area. Grain, forestry, lumber, and mining are the principal economic activities of the region. (DOI 2000)

North and west of the lake, the country is relatively mountainous and largely forested

with a small amount of farmland. Logging and mining dominate the economy. East of the lake, the country is more mountainous than rolling and is a mixt ure of forest and farmland. Forest products manufact uring dominates the economy. South of the Lake, the topography is generally flatland with low rolling hills. Agriculture is the backbone of the economy, with wheat as the primary crop. Recreational activities, largely fishing, supplement the economy and are potentially significant. (DOI 2000)

Lake Roosevelt is one of the major focal points of recreation in a region that boasts an abundance of recreational opportunities. Within a radius of approximately 100 miles from Grand Coulee Dam, there are four national forests, six other major lakes or reservoirs, several smaller reservoirs on the Columbia and Snake rivers, North Cascades National Park, and Lake Chelan National Recreation Area. T he national forests have a substantial complementary recreation potential, which consists of smaller lake and stream fishing, camping, hunting, and winter sports. T he Grand Coulee Dam itself is a tourist destination that attracts more than 400,000 visitors a year to tour the dam and watch the laser light show. (DOI 2000)

According to National Wetland Inventory maps (USFWS various dates):

- 0.74 linear miles of wetland frontage exists along Lake Roosevelt within the T DL for Daisy Mine;
- 14.33 linear miles of wetland frontage exists along the Colville River within the T DL for L-Bar/Northwest Magnesite;
- 14.02 linear miles of wetland frontage exists along the Colville River within the T DL for Northwest Alloys;
- 1.06 linear miles of wetland frontage exists along the Kettle River Arm and 1.46 linear miles of wetland frontage exists along Lake Roosevelt within the T DL for Napoleon Mine/Mill;
- 1.79 linear miles of wetland frontage exists along Onion Creek within the T DL for Van Stone Mine/Mill;
- 0.6 linear miles of wetland frontage exists along Lake Roosevelt within the T DL for LeRoi/Northport Smelter;
- 3.91 linear miles of wetland frontage exists along Deep Creek within the T DL for Black Rock Mine/Mill;
- 4.15 linear miles of wetland frontage exists along Deep Creek within the T DL for Great Western Mine;
- 4.15 linear miles of wetland frontage exists along Deep Creek within the T DL for Last Chance Mine/Mill;
- 4.55 linear miles of wetland frontage exists along Deep Creek within the T DL for Deep Creek Mine;
- 10.14 linear miles of wetland frontage exists along Deep Creek within the T DL for Copper King Mine;
- 10.05 linear miles of wetland frontage exists along Deep Creek within the T DL for Sierra Zinc Mine/Mill;
- 1.25 linear miles of wetland frontage exists along Republican Creek, 5.46 linear

miles of wetland frontage exists along Deep Creek, and 0.4 linear mile of wetland frontage exists along Deep Lake within t he T DL for Elect ric Point Mine/Mill;

- 6.54 linear miles of wetland frontage exists along Deep Creek and 0.4 linear mile of wetland frontage exist s along Deep Lake within the T DL for Gladstone Mine/Mill;
- 0.5 linear mile of wetland frontage exists along Hartbauer Creek, 8.62 linear miles of wetland frontage exists along Deep Creek, and 0.4 linear mile of wetland frontage exists along Deep Lake within the T DL for Red T op Mine;
- 8.93 linear miles of wetland frontage exists along Deep Creek and 0.4 linear mile of wetland exists along Deep Lake wit hin the T DL for Anderson Calhoun Mine/Mill;
- 0.5 linear mile of wetland frontage exists along Hartbauer Creek, 7.64 linear miles of wetland frontage exists along Deep Creek, and 0.4 linear mile of wetland frontage exists along Deep Lake within the T DL for Iroquois Mine; and
- 1.37 linear miles of wetland frontage exists along Lake Roosevelt within the T DL for Melrose Mine.

7.21 SAMPLE LO C ATIO NS

T wo sediment samples were collected near L-Bar/Northwest Magnesite to determine whether contaminants from sources at L-Bar/Nort hwest Magnesit e have impact ed the West Ditch and t he Colville River (Figure 6-4). LBDT 01SD was collected in the West Ditch approximately 400 feet south of the confluence wit h the Colville River. LBPP01SD was collect ed in t he Colville River at the confluence with the West Ditch.

T wo sediment samples were collected near Northwest Alloys to determine whether contaminants from sources at Northwest Alloys have impacted Stensgar Creek and the Colville River . NACK01SD was collected in Stensgar Creek approximately 50 feet east of the confluence of the ditch wit h St ensgar Creek. NAPP01SD was collect ed at the confluence of St ensgar Creek with t he Colville River.

One sediment sample was collected at Deep Creek Mine to determine whether contaminants from the tailings and waste rock piles have impacted Deep Creek (Figure 6-26). DCSD01SD was collected on the west shore of Deep Creek near waste rock pile 1 which drains by sheet flow into Deep Creek.

One sediment sample was collect ed at Anderson Calhoun Mine/Mill t o det ermine whet her contaminants from the tailings and waste rock piles have impacted the unnamed creek (Figure 6-38).

ANCK01SD was collected at the northern end of the property adjacent to private farmland and downgradient from t he t ailings and wast e rock piles.

Samples collected from tribut aries by WEST ON that are associated with the mines/mills are as follows (Appendix H):

- Magee Creek, associated with Daisy Mine (T S013);

.+ Onion Creek, associated with Van Stone Mine/Mill (T S099); and
.+ Deep Creek, associated with Black Rock Mine/Mill, Great Western Mine, Last Chance Mine/Mill, Deep Creek Mine, Copper King Mine, Sierra Zinc Mine/Mill, Electric Point Mine/Mill, and Gladstone Mine (T S105).

7.22 SAMPLE RESULTS

L-Bar/Northwest Magnesite. Sample results are summarized in Tables 7-2 and 7-3. No analytes were detected at elevated concentrations in the sediment sample collected from the West Ditch. Lead was detected at an elevated concentration in the sediment sample collected from the Colville River, however, this analyte was not similarly detected in corresponding PPE sediment samples.

Northwest Alloys. Sample results are summarized in Tables 7-4 and 7-5. No analytes were detected at elevated concentrations in the sediment samples collected from Stensgar Creek or from the Colville River.

Deep Creek Mine. Sample results are summarized in Table 7-6. No analytes were detected at elevated concentrations in the sediment sample collected in Deep Creek. **Anderson Calhoun Mine/Mill.** Sample results are summarized in Table 7-7. No analytes were detected at elevated concentrations in the sediment sample collected in the unnamed creek. Refer to Appendix H for WEST ON's tributary sample results.

Table 7-1 PROBABLE POINT OF ENTRY LOCATIONS UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

PROPERTY	PPE	LOCATION
Daisy Mine (Figure 6-2)	PPE 1	A wet area originating from the shaft and extending towards Magee Creek.
L-Bar/Northwest Magnesite (Figure 6-4)	PPE 1	The confluence of the Main Ditch with the Colville River.
Northwest Alloys (Figure 6-6)	PPE 1	The confluence of the ditch with Stensgar Creek.
Napoleon Mine/Mill (Figure 6-8)	PPE 1	The confluence of adit discharge and the intermittent creek.
Van Stone Mine/Mill (Figures 6-13 and 6-14)	PPE 1	The confluence of tailings pile to the fourth unnamed creek near the entrance to the mine/mill.
	PPE 2	The confluence of tailings pile to the fourth unnamed creek near the entrance to the mine/mill.

	PPE 3	The confluence of the excess mine pit water that seeps through rock-fill to the adjacent creek.
	PPE 4	The confluence of the old tailings pile to the second unnamed creek located at the southwest portion of the pile.
LeRoi/Northport Smelter (Figure 6-17)	PPE 1	The former tailings pile adjacent to a recently constructed ditch.
	PPE 2	Recently constructed ditch where a former tailing pile potentially was located.
	PPE 3	The slag pile on the shore of the Columbia River.
Last Chance Mine/Mill (Figure 6-22)	PPE 1	The adit discharge which flows into the unnamed creek.
	PPE 2	The adit discharge that continues west past the waste rock piles. through the tailings pile and infiltrates the ground prior to reaching the Colville-Alladin Northport Road.
Deep Creek Mine (Figure 6-24)	PPE 1	Potential overland flow from the waste rock pile to Deep Creek.
	PPE 2	A swampy area located south of the gated entrance could flow to Deep Creek.
Copper King Mine (Figure 6-26)	PPE 1	There is a potential that during heavy flow adit 2 discharge could reach Deep Creek.
Sierra Zinc Mine/Mill (Figure 6-28)	PPE 1	There could be potential overland flow from the tailings to the drainage ditch.
Anderson Calhoun Mine/Mill (Figure 6-36)	PPE 1	A marshy wetland area was noted on the western portion of the stream and adjacent to the eastern portion of the tailings pile and evaporation pond.
Melrose Mine (Figure 6-40)	PPE 1	Adit discharge flows approximately 40 feet east to an unnamed tributary that feeds into Tom Bush Creek.

Table 7-2 L-BAR/NORTHWEST MAGNESITE DITCH SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	**01374104**	**01374101**
CLP Inorganic ID	**MJ0KC4**	**MJ0KC1**
CLP Organic ID	**J0KC4**	**J0CK1**
F. & F. Sample ID	**01090404**	**01090401**
Station Location	**LBBK01SD**	**LBDT01SD**
Sample Depth (inches)	**0-8**	**0-8**
Description	**Background**	**Ditch**
TAL Metals (mg/kg)		
Aluminum	**20200**	**18600**
Arsenic	**12.1**	**9.4**
Barium	**450**	**332**
Cadmium	**3.4**	1.1 JB
Calcium	**39600**	**7670**
Chromium	**32.3**	**22.4**
Cobalt	**11.9**	7.3 JB
Copper	**69.3**	**70.4**
Iron	**27900**	**20700**

Lead	**124**	**34.7**
Magnesium	**33500**	**29000**
Manganese	**673**	**388**
Mercury	0.10 JB (0.10 SQL)	0.14 U
Nickel	**31.9**	17.9 JB
Potassium	**3920 JK**	**13400 JK**
Selenium	0.7 UJK	**12.4 JL**
Vanadium	**47.4**	**39**
Zinc	**239**	**206**

Note: Bold type indicates sample concentration is above the detection limit.

- Underlined type indicates the sample results is significant as defined in Section 5.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
BK = Background.
CLP = Contract Laboratory Program.
DT = Ditch.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
LB = L-Bar/Northwest Magnesite.
mg/kg = Milligrams per kilogram.
SD = Sediment.
SQL = Sample quantitation limit.
TAL = Target Analyte List.
U = The analyte was not detected. The associated numerical value is the contract required detection limit.

Table 7-3 L-BAR/NORTHWEST MAGNESITE RIVER SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	**01374111**	**01374110**
CLP Inorganic ID	**MJ0KD2**	**MJ0KD1**
CLP Organic ID	**J0KD2**	**J0KD1**
E & E Sample ID	**01090411**	**01090410**
Station Location	**LBBK02SD**	**LBPP01SD**
Sample Depth (inches)	**0-8**	**0-8**
Description	**Background**	**Colville River**
TAL Metals (mg/kg)		
Aluminum	**3960**	**8500**
Arsenic	**2.8**	**5.0 JK**
Barium	**63.0**	**133**

Cadmium	0.05 U	0.07 U
Calcium	**5740**	**7610**
Chromium	**6.8**	**14.1**
Cobalt	4.7 JB (12.4 SQL)	7.0 JB
Copper	**6.5**	**12.3**
Iron	**10200**	**16800**
Lead	**4.5**	**115**
Magnesium	**3720**	**6450**
Manganese	**144**	**273**
Mercury	0.06 U	0.08 U
Nickel	7.0 JB (9.9 SQL)	**14.1**
Potassium	603 JB	1560 JB
Selenium	0.84 UJL	1.1 JB
Vanadium	10.9 JB (12.4 SQL)	**23.0**
Zinc	**26.5**	**52.2**

Note: Bold type indicates sample concentration is above the detection limit.

Underlined type indicates the sample results is significant as defined in Section 5.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
BK = Background.
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
L = Low bias.
LB = L-Bar/Northwest Magnesite.
mg/kg = Milligrams per kilogram.
PP = PPE.
PPE = Probable point of entry.
SD = Sediment.
SQL = Sample quantitation limit.
TAL = Target Analyte List.
U = The analyte was not detected. The associated numerical value is the contract required detection limit.

Table 7-4 NORTHWEST ALLOYS CREEK SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	**01374108**	**01374106**
CLP Inorganic ID	**MJ0KC8**	**MJ0KC6**

CLP Organic ID	J0KC8	J0KC6
E & E Sample ID	01090408	NACK01SD
Station Location	NABK01SD	NACK01SD
Sample Depth (inches)	0-8	0-8
Description	Background	Creek
TAL Metals (mg/kg)		
Aluminum	**2080**	**2490**
Arsenic	1.1 UJK	1.9 JB
Barium	34.0 JB (48.8 SQL)	41.4 JB
Calcium	**2730**	**5590**
Chromium	**5.4**	**4.9**
Copper	2.8 JB (6.1 SQL)	4.3 JB
Iron	**5590**	**6910**
Lead	**2.0**	**2.5**
Magnesium	**1430**	**1800**
Manganese	**91.7**	**105**
Nickel	3.6 JB (9.8 SQL)	4.9 JB
Potassium	605 JB	423 JB
Vanadium	8.9 JB (12.2 SQL)	9.5 JB
Zinc	**10.8**	**14.4**

Note: Bold type indicates sample concentration is above the detection limit.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
BK = Background.
CK = Creek.
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
mg/kg = Milligrams per kilogram.
NA = Northwest Alloys.
SD = Sediment.
SQL = Sample quantitation limit.
TAL = Target Analyte List.
U = The analyte was not detected. The associated numerical value is the contract required detection limit.

Table 7-5 NORTHWEST ALLOYS RIVER SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS STEVENS COUNTY, WASHINGTON

EPA Sample ID	01374109	01374105
CLP Inorganic ID	MJ0KC9	MJ0KC5
CLP Organic ID	J0CK9	J0KC5
E & E Sample ID	01090409	01090405
Station Location	NABK02SD	NAPP01SD
Sample Depth (inches)	0-8	0-8
Description	Background	Colville River
TAL Metals (mg/kg)		
Aluminum	13100	10100
Arsenic	4.3 JK	4 JB
Barium	205	182
Calcium	4940	8150
Chromium	24.7	14.6
Copper	21.3 JK	16.1
Iron	27900	17500
Lead	13.8	8.5
Magnesium	6940	5070
Manganese	507	364
Nickel	25.4	14.9 JB
Potassium	2550 JK	1640 JB
Vanadium	36.9	21.6 JB
Zinc	78.2	58.2

Note: Bold type indicates sample concentration is above the detection limit.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.

BK = Background

CLP = Contract Laboratory Program.

E & E = Ecology and Environment, Inc.

EPA = United States Environmental Protection Agency.

ID = Identification.

J = The analyte was positively identified. The associated numerical value is an estimate.

K = Unknown bias.

mg/kg = Milligrams per kilogram.

NA = Northwest Alloys.

PPE = Probable point of entry

SD = Sediment

SQL = Sample quantitation limit

TAL = Target Analyte List

U = The analyte was not detected. The associated numerical value is the contract required detection limit.

STEVENS COUNTY, WASHINGTON Table 7-6 DEEP CREEK MINE SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA RIVER MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS

EPA Sample ID	Background	01254275
CLP Inorganic ID		MJ0EQ9

CLP Organic ID		**NU**
E & E Sample ID		**NU**
Station Location		**DCSD01SD**
Sample Depth (inches)		**0-6**
Description		**Deep Creek**
TAL Metals (mg/kg)		
Aluminum	**20200**	**4430**
Arsenic	**13.0**	1.3 U
Barium	**450**	39.6 JB
Cadmium	**3.4**	0.08 U
Calcium	**109000**	**9860**
Chromium	**32.3**	**7.1**
Cobalt	**11.9**	3 JB
Copper	**69.3**	2.5 JB
Iron	**27900**	**8640**
Lead	**124**	**5.5**
Magnesium	**33500**	**6100**
Manganese	**673**	**117**
Nickel	**31.9**	6.1 JB
Potassium	**3920 JK**	818 JB
Vanadium	**47.4**	11 JB
Zinc	**239**	**33.2**

Note: Bold type indicates sample concentration is above the detection limit.

Key:

B = The reported concentration is between the instrument detection limit and the contract required detection limit.
CLP = Contract Laboratory Program.
DC = Deep Creek Mine.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
mg/kg = Milligrams per kilogram.
SD = Sediment.
TAL = Target Analyte List.
U = The analyte was not detected. The associated numerical value is the contract required detection limit.

STEVENS COUNTY, WASHINGTON Table 7-7 ANDERSON CALHOUN MINE/MILL SEDIMENT SAMPLES ANALYTICAL RESULTS SUMMARY UPPER COLUMBIA MINES AND MILLS PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS

EPA Sample ID	**Background**	**01374177**
CLP Inorganic ID		**MJ0KJ6**
CLP Organic ID		**J0KH4**
E & E Sample ID		**01090428**
Station Location		**ANCK01SD**

Sample Depth (inches)		0-8
Description		Unnamed Creek
TAL Metals (mg/kg)		
Aluminum	**20200**	**9060 JK**
Arsenic	**13.0**	13.3 JB
Barium	**450**	**8720 JK**
Cadmium	**3.4**	6.0 JB
Calcium	**109000**	**69200 JK**
Chromium	**32.3**	**27.8 JK**
Cobalt	**11.9**	10.5 JB
Copper	**69.3**	34.9 JB
Iron	**27900**	**29200 JK**
Lead	**124**	**43.0 JK**
Magnesium	**33500**	5850 JB
Manganese	**673**	**926 JK**
Mercury	0.10 JB (0.102 SQL)	R
Nickel	**31.9**	33.2 JB
Potassium	**3920 JK**	1300 JB
Selenium	1.4 JB (1.7 SQL)	**12.1 JK**
Vanadium	**47.4**	33.9 JB
Zinc	**239**	**155 JK**
Pesticide/PCBs (mg/kg)		
Endrin Ketone	**4.0**	18 U

Note: Bold type indicates sample concentration is above the detection limit.
Underlined type indicates the sample results is elevated as defined in Section 5.

Key:

AN = Anderson Calhoun Mine/Mill.
B = The reported concentration is between the instrument detection limit and the contract required detection limit.
CK = Creek.
CLP = Contract Laboratory Program.
E & E = Ecology and Environment, Inc.
EPA = United States Environmental Protection Agency.
ID = Identification.
J = The analyte was positively identified. The associated numerical value is an estimate.
K = Unknown bias.
mg/kg = Milligrams per kilogram.
µg/kg = Micrograms per kilogram.
PCBs = Polychlorinated biphenyls.
R = The data are unusable for all purposes.
S = Sediment.
SQL = Sample quantitation limit.
TAL = Target Analyte List
U = The analyte was not detected. The associated numerical value is the contract required detection limit.

8. SUMMARY AND CONCLUSIONS

In June and September 2001, the START-2 conducted PAs and SIs of mines/mills located near the upper Columbia River in Stevens County, Washington.

The purpose of the PAs and SIs were to identify and investigate potential sources of

contamination to t he upper Columbia River. Of t he 39 mines/mills visit ed, sampling was conducted at 18 properties. Sampling was conduct ed at t hose mines/mills where pot ent ial sources of contamination were identified and potential impacts to receptors via the surface water migration pathway were observed.

T he PAs and SIs activities involved the collection of samples from potential hazardous substance source areas and from target areas/receptors potentially impacted by contaminant migration. A total of 216 samples submitted for EPA CLP methods of analysis were collected, including background samples but excluding QA samples. T he media sampled included surface soil, tailings, waste rock, surface water and sediment. Sect ion 8.1 summarizes the findings and conclusions for t hose mines/mills t hat were sampled. T his sect ion does not include a discussion for sit es t hat were not sampled. Sampling was not conducted at sites where no contaminant source was observed and/or where no surface water features including overland drainage routes were identified. Recommendations for all sites are presented in

8.1 FINDINGS AND C O NC LUSIO NS

8.1.1 Dai sy Min e

Samples were collected from potential contaminant source areas at the Daisy Mine including a tailings pile and shaft. A PPE sample was also collect ed. T he t ailings pile measured 150 feet at the base, 30 feet in height with a slope of approximately 35%, and a depth of approximately 45 feet. T he shaft measured 10 feet by 10 feet by unknown depth. A wet area originating from the shaft extended south approximately 25 feet. A depression south of the wet area was noted where potential pooling of water from the shaft would occur which would then flow into the ditch, past the culvert, and into Magee Creek approximately 70 feet (PPE 1).

Surface soil samples collected from the tailings pile contained significant concentrations of T AL metals including arsenic (233 mg/kg) and mercury (2.9 mg/kg).

Analytes detected in the discharge from the shaft include arsenic (95.3 .g/L), cadmium (7.1 .g/L), lead (5.2 .g/L), and zinc (829 .g/L). No elevated concentrations of T AL metals were detected in the PPE sample. Based on an evaluation of technical data using the EPA HRS

model criteria, no further action
under CERCLA is recommended at the Daisy Mine site.

8.1.2 L-Bar/Northwest Magnesite

T he contaminant sources at L-Bar/Northwest Magnesite includes a magnesite pile, and flux bar and flux bar residue. T he magnesite residue pile measures approximately 30 feet deep and 17 acres in area. Past operating practices and inadequate storage of flux bar and flux bar residue have resulted in elevated levels of mostly chloride and ammonia in shallow groundwater and surface water. Most of the materials remaining on the plant have continued to leach salts and ammonia into shallow groundwater and surface water in two ditches. (Ecology 2001)

Sediment samples were collected during the Phase I RI from six locations: three in the Main Ditch, two in the West Ditch, and one from the Logan Road ditch south of the property. Review of trace metals analyses shows that barium, manganese, and selenium concentrations in the Main Ditch sediment samples exceeded the concentrations detected in the background sample collected from Logan Road ditch south of the property. T race metals results from the West Ditch samples were similar to Main Ditch samples in that background concentrations were exceeded for arsenic, barium, copper, manganese, and selenium. Concentrations of these metals were less than 2 times background levels except for selenium, which was approximat ely 7 times background. (CH2MHill 1998)

Sediment samples were collected at two PPEs by the ST ART-2 in the West Ditch. One downstream sediment sample was also collected from the West Ditch and one sediment sample was collected from t he Colville River.

Samples collected from the West Ditch contained elevated concentrations of T AL metals including selenium (18.0 mg/kg JK).

Lead was detected at an elevat ed concentrat ion in the Colville River sample; however. this analyte was not similarly detected in PPE samples.

Based on an evaluation of technical data using the EPA HRS model criteria, further action under CERCLA or other authorities is recommended at the L-Bar/Northwest Magnesite site. A Cleanup Action
Plan for the site was approved by Ecology in June 2000 requiring source removal, monitoring, and inst itutional cont rols.

8.1.3 Northwest Alloys

T he plant is cont ained wit hin gates and hillsides. T here is no overland flow from the sit e directly into t he Colville River due to topography. A potential overland flow exists on the western portion of the plant. T he overland flow potentially flows through ditches (PPE 1) south towards Stensgar Creek. Stensgar Creek, located south of t he plant , maint ains brown trout . St ensgar Creek feeds into t he Colville River. One PPE sample and two target/receptor samples were collected.

Samples collected in the ditch at PPE 1 contained elevated concentrations of arsenic (4.9 mg/kg), copper (18.7 mg/kg), lead (7.5 mg/kg), and zinc (47.9 mg/kg). No elevated concentrations of T AL metals were detected in target/receptor samples.

Based on an evaluation of technical data using the EPA HRS model criteria, no further action under CERCLA is recommended at the Northwest Alloys site. However, voluntary cleanup actions currently are being carried out at the site under the Model T oxics Cleanup Authority, Voluntary Cleanup Program administered by Ecology's Industrial Section.

8.1.4 Napoleon Mine/Mill

T he mine/mill area consisted of an adit measuring 5 feet by 4 feet located sout h of the dirt road entrance. T here was no evidence of tailings or waste rock present on the propert y. T he adit discharge flowed across t he dirt road, down t he hillside approximately 120 feet before entering an intermittent creek (PPE 1). Iron staining was present on the soil and the dirt road. T here was no adit discharge at the time of the visit. One surface water sample from the adit was collected. One PPE sample was also collected.

Analytes detected in the discharge from the adit include lead (11.3 .g/L), and zinc (937 .g/L).

Significant levels of T AL metals were detected in the PPE sample including copper (207 mg/kg) and silver (2.3 mg/kg)..

Analytical results of samples collected indicate that hazardous substances are migrating to targets/receptors.

Based on an evaluation of technical data using the EPA HRS model criteria, no further action under CERCLA is recommended at t he Napoleon Mine/Mill sit e.

8.1.5 Van Stone Mine/Mill

Samples were collected from potential contaminant source areas at the Van Stone Mine/Mill including a waste rock pile, two t ailings piles, 7 stained soil areas, and mine pit wat er. Four PPE samples were also collected.

Surface soil samples collected from source areas contained significant concentrations of T AL metals including cadmium (940 mg/kg), lead (181,000 mg/kg), mercury (6.0 mg/kg), and zinc (431,000 mg/kg).

T he PPE samples contained elevated concentrations of T AL metals including cadmium (11.9 mg/kg) and zinc (3,670 mg/kg).

In t he past , the mine, slurry flume, and t ailings piles were likely a source of sediment t o streams in the Onion Creek watershed. Based on aerial photo evidence and anecdotal reports from area residents, the slurry flume periodically broke, and the tailings slurry was dumped int o the stream nort h of the old tailings pile for hours at a t ime before t he break was discovered and repaired. In addition, it is report ed that t he old tailings pile wall was breached at least once in the past, transporting tailings material into t he stream. (Boise Cascade Corporation 1997)

T he new t ailings pile is not report ed to have had any major erosion occurrences; however, there is a layer of tailings material several feet thick covering the st ream valley nort h of the new tailings pile (Boise Cascade Corporation 1997).

At present, t he steep outer walls of the t ailings piles are subject t o surface erosion, as evidenced by the rills and gullies developed on the walls. A small berm has been made around the tailings piles to contain eroded material and is effective in containing eroded material. T he owner is testing erosion control methods on t he t ailings pile walls. (Boise Cascade Corporation 1997)

> Analytical results of samples collected indicate that hazardous substances are migrating to targets/receptors. Based on an evaluation of technical data using the EPA HRS model criteria, further action under CERCLA or other aut horities is recommended at t he Van Stone Mine/Mill site.

8.1.6 LeRoi/Northport Smelter

Samples were collected from potential contaminant source areas at the LeRoi/Northport Smelter including surface soil west of the former tailings area underneat h slag bricks, sediment from slag areas along the Columbia River adjacent to the smelter (PPE 3), and sediment in the

western portion of the recently constructed ditch where the former tailings pile was located (PPE 1 and PPE 2).

Surface soil samples from source areas contained significant concentrations of T AL metals including arsenic (297 mg/kg JL), cadmium (105 mg/kg), lead (10,500 mg/kg), mercury (0.40 mg/kg), and zinc (5,420 mg/kg).

Sediment samples collected from the Columbia River contained elevated concentrations of T AL metals including arsenic (41.4 mg/kg), cadmium (4.9 mg/kg), copper (2,960 mg/kg), lead (845 mg/kg JK), mercury (0.29 mg/kg), and zinc (16,900 mg/kg).

T he ditch PPE samples contained elevated concentrations of T AL metals including arsenic

(39.9 mg/kg JK), cadmium (5.9 mg/kg JK), copper (1,090 mg/kg), lead (887 mg/kg JK), and zinc (223 mg/kg). Analytical results of samples collected indicate that hazardous substances are migrating to targets/receptors.

Based on an evaluation of technical data using the EPA HRS model criteria. further action under CERCLA or other authorities is recommended at the LeRoi/Northport Smelter site.

8.1.7 Black Rock Mine/Mill

Samples were collected from potential contaminant source areas at the Black Rock Mine/Mill including a waste rock pile and soil near the collapsed mill building. No PPEs were identified by the ST ART-2.

Soil samples collected from source areas contained significant concentrations of T AL metals including cadmium (1,630 mg/kg), lead (6,520 mg/kg), mercury (26.4 mg/kg) and zinc (402,000 mg/kg).

Based on an evaluation of technical data using the EPA HRS model criteria. no further action under CERCLA is recommended at t he Black Rock Mine/Mill site.

8.1.8 Great Western Mine

Samples were collected from potential contaminant source areas at the Great Western Mine including two waste rock piles. No PPEs were identified by the ST ART-2.

Samples collected from the waste rock piles contained significant concentrations of T AL

metals including cadmium (490 mg/kg JL), lead (24,000 mg/kg), mercury (4.3 mg/kg), and zinc (118,000 mg/kg JK).

Based on an evaluation of technical data using the EPA HRS model criteria, no further action under CERCLA is recommended at the Great Western Mine site.

8.1.9 Last Chance Mine/Mill

Samples were collected from potential contaminant source areas at the Last Chance Mine/Mill including waste rock piles, tailings pile, soil from the former mill building area, and adit discharge. T wo PPE samples were also collected.

Surface soil samples collected from the waste rock piles, tailings pile, and the former mill building area contained significant concentrations of T AL metals including cadmium (518 mg/kg JH), lead (170,000 mg/kg), mercury (2.7 mg/kg), and zinc (112,000 mg/kg).

T he PPE samples contained elevated concentrations of T AL metals including cadmium (56.9 mg/kg JH). lead (14,600 mg/kg), mercury (1.2 mg/kg), and zinc (13,400 mg/kg).

Analytical results of samples collected indicate that hazardous substances are migrating to targets/receptors.

Based on an evaluation of technical data using the EPA HRS model criteria, further action under CERCLA or other aut horities is recommended at t he Last Chance Mine/Mill site.

8.1.10 Deep Creek Mine

Samples were collected from potential contaminant source areas at the Deep Creek Mine including waste rock piles, tailings piles, and adit discharge. One PPE sample was also collected. Surface soil samples collected from the waste rock piles and tailings piles contained significant concentrations of T AL metals including cadmium (425 mg/kg), lead (13,300 mg/kg). mercury (3.2 mg/kg), and zinc (123,000 mg/kg). Analytes detected in the discharge from the adit include lead (12.9 .g/L). and zinc (558 .g/L). No elevated concentrations of T AL metals were detected in the PPE sample. Based on an evaluation of technical data using the EPA HRS model criteria. no further action under CERLCA is recommended at the Deep Creek Mine site.

8.1.11 Copper King Mine

Samples were collected from potential source areas at the Copper King Mine including waste rock pile and adit discharge. One PPE sample was also collected. Surface soil samples collected from the waste rock pile contained significant concentrations of T AL metals including copper (1,700 mg/kg), selenium (18.9 mg/kg), and thallium (3.7 mg/kg).

Analytes detected in the discharge from the adit include lead (17.9 .g/L), and zinc (180 .g/L). No elevated concentrations of T AL metals were detected in the PPE sample.

Based on an evaluation of technical data using the EPA HRS model criteria, no further action under CERCLA is recommended at the Copper King Mine site.

8.1.12 Sierra Zinc Mine/Mill

Samples were collected from potential contaminant source areas at the Sierra Zinc Mine/Mill including waste rock pile, tailings pile area, soil from mill area, and adit discharge.

Surface soil samples collected from the waste rock pile and tailings pile area contained significant concentrations of T AL metals including cadmium (130 mg/kg), lead (15,800 mg/kg), mercury (2.7 mg/kg JL), and zinc (33,400 mg/kg). Analytes detected in the discharge from the adit include zinc (292 .g/L). Based on an evaluation of technical data using the EPA HRS model criteria, no further action under CERCLA is recommended at t he Sierra Zinc Mine/Mill site.

8.1.13 Electric Point Mine/Mill

Samples were collected from potential contaminant source areas at the Electric Point Mine/Mill including waste rock piles, tailings pond, and soil from the mill area. No PPEs were identified by t he ST ART-2.

Surface soil samples collected from source areas contained significant concentrations of T AL metals including cadmium (25.0 mg/kg JL), lead (97,800 mg/kg), and zinc (33,800 mg/kg),

Based on an evaluation of technical data using the EPA HRS model criteria, no further action under CERCLA is recommended at t he Elect ric Point Mine/Mill site.

8.1.14 Gladstone Mine/Mill

Samples were collected from potential contaminant source areas at the Gladstone Mine/Mill including tailings pile and soil from the potential mill area. No PPEs were identified by the ST ART-2.

Surface soil samples collected from source areas contained significant concentrations of lead (94,000 mg/kg), mercury (0.30 mg/kg), and zinc (10,500 mg/kg).

Based on an evaluation of technical data using the EPA HRS model criteria, no further action under CERCLA is recommended at t he Gladstone Mine/Mill sit e.

8.1.15 Red Top Mine

Samples were collected from potential contaminant source areas at the Red T op Mine including a waste rock pile. No PPEs were identified by the ST ART-2.

Surface soil samples collected from the waste rock pile contained significant concentrations for cadmium (177 mg/kg JH), lead (28,900 mg/kg), mercury (1.1 mg/kg), and zinc (15,700 mg/kg).

Based on an evaluation of technical data using the EPA HRS model criteria, no further action under CERCLA is recommended at the Red T op Mine site.

8.1.16 Anderson Calhoun Mine/Mill

Samples were collected from potential contaminant source areas at the Anderson Calhoun Mine/Mill including tailings piles, stained surface soil areas, and mine/mill pit water. One PPE sample was also collected.

Surface soil samples collected from the tailings pile and stained soil area contained significant concentrations of T AL metals including cadmium (129 mg/kg), lead (2,190 mg/kg), mercury (0.35 mg/kg), and zinc (49,000 mg/kg). Analyt es detected in t he mine/mill pit water include lead (192 .g/L) and zinc (1,480 .g/L). T he PPE sample contained elevated concentrations of T AL metals including arsenic (10.0 mg/kg), cadmium (7.5 mg/kg), lead (320 mg/kg), mercury (0.17 mg/kg), and zinc (3,250 mg/kg). Analytical results of samples collected indicate that hazardous substances are migrating to targets/receptors.

Based on an evaluation of technical data using the EPA HRS model criteria, further action under CERCLA or other aut horities is recommended at t he Anderson Calhoun Mine/Mill sit e.

8.1.17 Iroquois Mine

Samples were collected from potential contaminant source areas at the Iroquois Mine including waste rock pile and adit discharge. No PPEs were identified by the ST ART-2.

Surface soil samples collected from the waste rock pile contained significant concentrations of T AL metals including cadmium (39.1 mg/kg), mercury (0.49 mg/kg), and zinc (12,300 mg/kg).

Analytes detected in the adit discharge include zinc (583 .g/L).

Based on an evaluation of technical data using the EPA HRS model criteria, no further action under CERCLA is recommended at the Iroquois Mine site.

8.1.18 Melrose Mine

Samples were collected from potential contaminant source areas at Melrose Mine including adit discharge. One PPE sample was also collected.

Analytes detected in the adit discharge include zinc (433 .g/L).

T he PPE sample contained elevated concentrations of T AL metals including cadmium (22.8 mg/kg JH) and zinc (1,650 mg/kg). Analytical results of samples collected indicate that hazardous substances are migrating to targets/receptors.

Based on an evaluation of technical data using the EPA HRS model criteria, no further action under CERCLA is recommended at the Melrose Mine site.

Table 8-1 CERCLA RECOMMENDATIONS UPPER COLUMBIA RIVER MINES PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS STEVENS COUNTY.

EPA CERCLIS Number	Site Name	CERCLA Activity Type	Recommenda
WAN001002371	Daisy Mine	Preliminary Assessment/Site Inspection	No further action under CERCLA
WAD097824577	L-Bar/Northwest Magnesite	Preliminary Assessment/Site Inspection	Further action under CERCLA.
WAD094626868	Northwest Alloys	Preliminary Assessment/Site Inspection	No further action under CERCLA
WAN001002391	Napoleon Mine/Mill	Preliminary Assessment/Site Inspection	No further action under CERCLA
WAN001002374	First Thought Mine	Preliminary Assessment	No further action under CERCLA
WAN001002384	Lottie Mine	Preliminary Assessment	No further action under CERCLA
WAN001002378	Homestake No. 1 Mine	Preliminary Assessment	No further action under CERCLA
WAN001002368	Antelope Mine	Preliminary Assessment	No further action under CERCLA
WAN001002380	Hubbard Mine	Preliminary Assessment	No further action under CERCLA
WAN001002392	New Leadville Mine	Preliminary Assessment	No further action under CERCLA

WAN001002395	R.J. Mine	Preliminary Assessment	No further action under CERCLA.
WAD980834808	Van Stone Mine/Mill	Preliminary Assessment/Site Inspection	Further action under CERCLA.
WAN001002379	Hope & Twin Cabins Mine	Preliminary Assessment	No further action under CERCLA.
WAN001002398	St. Crispin Mine	Preliminary Assessment	No further action under CERCLA.
WAN001002393	Northport Mill	Preliminary Assessment	No further action under CERCLA.
WAD988507323	LeRoi/Northport Smelter	Preliminary Assessment/Site Inspection	Further action under CERCLA.
WAN001002369	Black Rock Mine/Mill	Preliminary Assessment/Site Inspection	No further action under CERCLA.
WAN001002377	Great Western Mine	Preliminary Assessment/Site Inspection	No further action under CERCLA.
WASFN1002162	Last Chance Mine/Mill	Preliminary Assessment/Site Inspection	Further action under CERCLA.
WASFN1002161	Deep Creek Mine	Preliminary Assessment/Site Inspection	No further action under CERCLA.
WAN001002370	Copper King Mine	Preliminary Assessment/Site Inspection	No further action under CERCLA.
WAN001002396	Sierra Zinc Mine/Mill	Preliminary Assessment/Site Inspection	No further action under CERCLA.
WAN001002387	Magma Mine	Preliminary Assessment	No further action under CERCLA.
WAN001002373	Farmer Mine	Preliminary Assessment	No further action under CERCLA.
WAN001002388	Maki Mine	Preliminary Assessment	No further action under CERCLA.
WAN001002372	Electric Point Mine/Mill	Preliminary Assessment/Site Inspection	No further action under CERCLA.
WAN001002376	Gladstone Mine/Mill	Preliminary Assessment/Site Inspection	No further action under CERCLA.
WAN001002386	Lucky Four Mine	Preliminary Assessment	No further action under CERCLA.
WAN001002394	Red Top Mine	Preliminary Assessment/Site Inspection	No further action under CERCLA.
WAN001002309	Anderson Calhoun Mine/Mill	Preliminary Assessment/Site Inspection	Further action under CERCLA.
WAN001002385	Lucile Mine	Preliminary Assessment	No further action under CERCLA.

Table 8-1 CERCLA RECOMMENDATIONS UPPER COLUMBIA RIVER MINES PRELIMINARY ASSESSMENTS AND SITE INSPECTIONS STEVENS COUNTY,

EPA CERCLIS Number	Site Name	CERCLA Activity Type	Recommenda
WAN001002381	Iroquis Mine	Preliminary Assessment/Site Inspection	No further action under CERCLA.
WAN001002397	Silver Queen Mine	Preliminary Assessment	No further action under CERCLA.
WAN001002389	Melrose Mine	Preliminary Assessment/Site Inspection	No further action under CERCLA.
WAN001002383	Lakeview Mine	Preliminary Assessment	No further action under CERCLA.
WAN001002382	Jackson Mine	Preliminary Assessment	No further action under CERCLA.
WAN001002375	Frisco-Standard Mine	Preliminary Assessment	No further action under CERCLA.
WAN001002390	Myeerah Mine	Preliminary Assessment	No further action under CERCLA.
WAN001002399	United Treasure Mine	Preliminary Assessment	No further action under CERCLA.

Key:

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980.

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